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CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT

ADDRESSES AND ORIGINAL ARTICLES

Pneumococcal Infections.—(I.) Lobar Pneumonia in the Individual. By ROBERT CRUICKSHANK, M.D.—(*Illustrated*) 563
Epidemiology Applied to School Life. By J. A. H. BRINCKER, M.B., D.P.H. 569
Actinomycosis. By RALPH BATES, F.R.C.S. 571
The Grass-pollen Antigen for Hay-fever Desensitisation. By JOHN FREEMAN, D.M.—(*Illustrated*) 573
Pathology of Pyæmic Conditions. By T. H. C. BENIANS, F.R.C.S. 574
Magnesium Sulphate in the Treatment of Angiospasm. By N. PINES, M.B. 577

CLINICAL AND LABORATORY NOTES

Meningococcic Serum in Cerebro-spinal Fever. By J. TODESCO, M.D. 579
Sympathetic Denervation. By L. ROGERS, F.R.C.S. 580
Case of Generalised Vaccinia. By C. J. DE VERE SHORTT, M.B. 580

MEDICAL SOCIETIES

Fellowship of Medicine: Operation for Appendicitis 581
Medical Society of Individual Psychology 583
Royal Academy of Medicine in Ireland 583
North of England Obstetrical and Gynæcological Society .. 584
Medical Society of London: Chronic Pancreatitis.... 585

REVIEWS AND NOTICES OF BOOKS

The Sputum: Its Examination and Clinical Significance. By Randall Clifford, M.D. 587
Albert Schweitzer. My Life and Thought: an Autobiography. Translated by C. T. Campion 587
A Text-book of Midwifery. By Prof. R. W. Johnstone, M.D. 587
Syllabus of Medical History. By Victor Robinson, M.D. A Short History of Surgery. By Sir D'Arcy Power, F.R.C.S. Science and Superstition in the Eighteenth Century. By Philip S. Shorr, Ph.D. .. 587
Incomparable India. By Col. R. J. Blackham, M.R.C.P. 588
Sex Determination. By F. A. E. Crew 588
Alcohol and Man. Edited by H. Emerson, M.D. .. 588

LEADING ARTICLES

THE INTIMATE NATURE OF NERVOUS ACTIVITY..... 589
A NEW STUDY OF NEPHRITIS 590
BRITISH POST-GRADUATE MEDICAL SCHOOL 590

ANNOTATIONS

An International Symposium on Cirrhosis of the Liver..... 591
In Defence of Mary Stuart 592
Normal Hæmoglobin 592
Health of the American Student..... 593
Oscillometry and the "Mean" Pressure 593
Experimental Carcinogenesis 594
Safety in Childbirth 595
Rapid Digitalisation 595
Fractures of the Neck of the Femur 596
Epsom College 596

THE DOCTOR'S DAY

XIX.—With the Guards' Brigade 607

PUBLIC HEALTH SERVICES

Typhoid Fever Epidemic at Malton.—School Closure at Barnoldswick 605
Infectious Diseases in England and Wales .. 604

NEW INVENTIONS

Bentley Portable Head-Suspension Apparatus By H. J. Seddon, F.R.C.S.—(*Illustrated*) .. 586

SPECIAL ARTICLES

Food and Health: The Physiological Minimum 597
Medicine and the Law: "Misadventure by Narcotic Drugs."—Ear-cutting for Rickets.—Rights of R.A.M.C. Officer 600
Medical Society of London: Annual Dinner 602
Ireland: Appointment of an Assistant Medical Officer of Health 603
Paris: An Association of Practitioners 603

PANEL AND CONTRACT PRACTICE

The Central Practitioners' Fund 608

CORRESPONDENCE

The Production of Quinine (Col. S. P. James, M.D.) 609
Mobilisation of Sugar into the Blood During Rest (Dr. George Graham) .. 609
Raw and Pasteurised Milk (Dr. E. Sprawson, L.D.S.) 609
Filarial Periodicity (Dr. F. Murgatroyd) 610
"Excitability": A Cardiac Study" (Prof. W. Burridge) 610
Children in the Curriculum (Prof. T. Wardrop Griffith) 611
Control of Infections in Children's Wards (Dr. B. Schlesinger) 611
Experimental Shock (Prof. R. J. S. McDowall) 611

OBITUARY

Prof. Lloyd Turton Price, F.R.C.S.—(*With portrait*) 612
Albert Edward Roy Hoskins, M.B. 612
The late Dr. Alaric Ballance 612
John Griffiths, F.R.C.S.—(*With portrait*) 613

THE SERVICES

Royal Naval Medical Service.—Royal Army Medical Corps.—Indian Medical Service..... 613

PARLIAMENT

Notes on Current Topics: Shortage of Medical Officers in the Army.—The Air Estimates.—Pharmacy and Poisons Bill 614
House of Commons: National Health Insurance Medical Benefit.—Children and Road Accidents.—Ministry of Pensions Hospitals—Prevention of Distemper in Dogs 615

MEDICAL NEWS

Univ. of Cambridge 616
Roy. Coll. Surg. of England 616
Univ. of London 616
Amalgamation of Birmingham Hospitals.. 607
International Congress of Military Medicine..... 611
Work of Children's Hospitals 611
Institute for the Scientific Treatment of Delinquency 616
Fellowship of Med. and Post-grad. Med. Assoc. 616
Royal Sanitary Institute.. 616
Beit Memorial Fellowships for Medical Research.... 616
Internat. Cong. on Cancer 616
Memorial to Dr. Eichholz 616
Pay Beds 616
Contraceptive Methods .. 616
Research into Rheumatic Diseases 616
Society of Medical Officers of Health 617
General Nursing Council.. 617
Brighton Hospitals 617
London Clinic and Institute of Physical Medicine.... 617

NOTES, COMMENTS, AND ABSTRACTS

The Health of Merchant Seamen in 1931. By Fleet-Surgeon W. E. HOME 619
Housing of the Poor..... 619
Publicity and Crime..... 620
The Hygiene of Menstruation 620

Medical Diary 617
Vacancies 618
Births, Marriages, Deaths 618
Appointments 620

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ADDRESSES AND ORIGINAL ARTICLES

PNEUMOCOCCAL INFECTIONS*

By Robert Cruickshank, M.D. Aberd., D.P.H.

LECTURER IN BACTERIOLOGY, THE UNIVERSITY AND ROYAL INFIRMARY, GLASGOW; BACTERIOLOGIST TO GLASGOW ROYAL INFIRMARY

I.—LOBAR PNEUMONIA IN THE INDIVIDUAL †

The apologia for my subject is twofold. The continued prevalence of bacterial diseases disseminated by spray or droplet infection from the respiratory tract is in itself sufficient justification for bringing to your notice the group of respiratory infections—lobar pneumonia, broncho-pneumonia, and bronchitis—the most common cause of which is the pneumococcus. The need for a re-orientation in our methods of dealing with respiratory tract infections as well as a concentration of attack on this formidable group which includes measles, whooping-cough, scarlet fever, and diphtheria, is becoming generally realised by medical officers of health. In pneumonia even a cursory consideration reveals a complicated problem. Although "acute primary pneumonia" is a notifiable disease, there is no provision under the Act for a clinical separation of lobar from broncho-pneumonia, all pneumonias are not caused by the same organism, and even among pneumococcal pneumonias there are numerous different infecting types. It follows that the established facts about pneumococcal lobar pneumonia as a specific infection are still scanty and we cannot hope to diminish its incidence without an accurate knowledge of its behaviour.

The second reason is a corollary of the first but is more intimate. Three years ago an investigation into the value of the serum treatment of pneumonia was commenced in the Glasgow Royal Infirmary, with the financial assistance of the Scottish Branch of the British Red Cross Society, and has now developed into a large scale research into the clinical, bacteriological, and epidemiological aspects of the disease, in several hospitals, through the kindly coöperation of the medical officer of health, Dr. A. S. M. Macgregor. It cannot be too strongly emphasised that the investigation is the work of a team; indeed, work of this kind can only hope to be fruitful through the active coöperation of clinician, bacteriologist, and epidemiologist. Although the data so far collected are largely corroborative of results obtained elsewhere, there are not, so far as we are aware, comparable findings in our country, so that our data may be useful as a standard for comparison when similar investigations are instituted, as we hope they will be, in various centres in Britain. In these lectures I shall utilise material, including 1215 serologically typed cases of lobar pneumonia, collected between February, 1930, and September, 1932, and shall discuss in turn Lobar Pneumonia in the Individual, Lobar Pneumonia in the Community, and Broncho-pneumonia and other Pneumococcal Infections. It is obviously impossible in the compass of three lectures to review the enormous literature on pneumococcal infections. While, therefore, a certain orderly arrangement and sequence of facts will be attempted, greater prominence will be given to those aspects of the problem with which our own investigations have been concerned.

In considering any specific bacterial infection in the individual there are certain questions to which we expect answers. Of the bacteriologist we ask "What is the organism?" and "How does it affect the individual?"; of the physician we ask, "What is the patient's response to infection?"; of the immunologist, "How is the infection overcome?"; and of the therapeutist, "Is there a specific antidote?" When these questions are applied to lobar pneumonia, it will be seen how inadequate are some of the answers.

What is the Organism?

The pneumococcus is related to the large family of streptococcus. Its distinguishing characters are the possession of a capsule, ready autolysis best exemplified by its solubility in bile, and its very high pathogenicity for the mouse. Of these three tests of identity, bile-solubility is the only absolute one and should never be omitted. The high pathogenicity for mice is most useful in isolating the pneumococcus from sputum or other sources where there is a mixture of organisms. But the most important biological character of the pneumococcus is its possession of a capsule. Neufeld and Händel (1909) first discovered that pneumococcal strains are not all serologically identical. In 1913 Dochez and Gillespie, of the Rockefeller Institute, and F. S. Lister, of the South African Institute of Medical Research, independently, and by quite different methods, showed that there was a number of strictly specific pneumococcal strains responsible for lobar pneumonia. The Americans labelled their most common infecting Types I., II., III., and recognised in addition a heterogeneous Group IV., while Lister named his most frequent types A, B, C, &c. It was subsequently shown that C, B, and E corresponded respectively with the American Types I., II., and III., whereas A, the most common type in South Africa, was not identified with any of the American strains. The next step was the demonstration by Dochez and Avery (1917) that the pneumococcus parted, during the active stage of growth in vitro and during infection in vivo, with a soluble substance which was specific for each type and which was apparently associated with the capsule of the organism. Heidelberger and Avery (1923) in a chemical analysis found the specific soluble substance (S.S.S.) to be of carbohydrate nature and—a discovery of greater import—the chemical constitution of the S.S.S. from the three serological Types I., II., and III. was distinctive for each type. Griffith (1923) showed that the pneumococcus may by various methods be wholly deprived of its capsule and become a rough or R strain; it then no longer belongs to a specific type and all R strains are antigenically identical

* *Acknowledgments.*—My first debt is to clinical and public health colleagues: in the Royal Infirmary, Drs. John Cowan, A. W. Harrington, and J. Fleming; at Woodilee Hospital, Dr. J. McLeod; at Ruchill Hospital, Dr. T. Anderson; at Knightswood Hospital, Dr. I. M. Christie; at the Royal Hospital for Sick Children, Prof. G. B. Fleming and Dr. J. W. S. Blacklock; and in the Sanitary Chambers, Dr. A. S. M. Macgregor, medical officer of health, and his statistical staff. The bulk of the cases of lobar pneumonia analysed in these lectures have been admitted to Belvidere Hospital, largely under the care of Dr. J. Montgomery, with whom I have collaborated during the past three years. To him especially I am indebted for his most careful clinical examination of the cases, without which such work as this would be valueless. Much of the technical work in the laboratory has been done by my laboratory assistant, Mr. D. B. Colquhoun. I have to thank Prof. C. H. Browning, Dr. Cowan, and Dr. Macgregor for revision of the text and for much valuable advice and criticism. The Medical Research Council have given me financial assistance and also encouragement throughout the investigation.

† The first Milroy lecture for 1933 delivered before the Royal College of Physicians of London on Feb. 23rd.

(Reimann, 1925). The present conception then of the pneumococcus is of an organism with a protein nucleus common to the species surrounded by a carbohydrate envelope which, because of the differences in its chemical constitution, confers specificity upon the pneumococcus and divides the strains into a number of distinct serological types. So far, 32 such types have been separated by serological tests.

Besides a *qualitative* difference there is also a *quantitative* difference in the capsular substance of the three most common Types, I., II., and III. This difference is readily appreciable with Type III. pneumococcus which has a voluminous capsule and a spreading mucoid colony. The distinction between Types I. and II. is less evident. Avery et al. (1917)

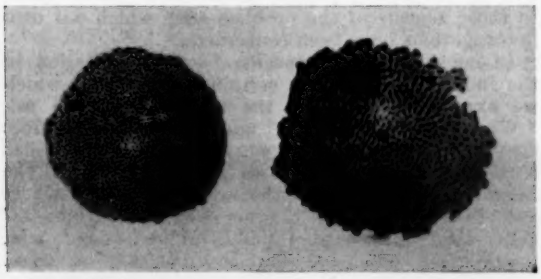

FIG. 1.—Six-hour colonies of pneumococci on serum agar showing closer texture of Type I. (on left) compared with Type II.

state that "in Type II. pneumococci the capsules are generally somewhat larger and denser than in Type I." We have stained many preparations by different methods of capsular staining, but have found it difficult to differentiate between Types I. and II. pneumococci in this way. We have been impressed, however, by differences in the size and appearance of the colonies of Types I., II., and III. pneumococci growing on artificial culture media. Examination under the microscope of young growing colonies (four to eight hours) has shown a definite difference in the colonial "texture" of each type, that of Type I. being most compact, of Type II. less close, and of Type III. a still looser texture, indicating, I think, a difference in the amount of capsular substance round each organism, so that the bigger the capsule the looser the texture of the colony (Fig. 1). There are other methods of demonstrating this quantitative difference if we accept the view that the capsule is intimately associated with the production of S.S.S. Dochez and Avery (1917), for example, found that in young broth cultures, S.S.S. was first demonstrable for Type III. pneumococcus, then for Type II., and lastly, for Type I., while Blake (1917) by inoculating separate mice with equal amounts of culture of Types I., II., and III. pneumococci showed that precipitinogen, presumably S.S.S., was demonstrable in the peritoneal exudate of Type III. mouse in five hours, of Type II. mouse in six hours, and of Type I. mouse in seven hours. Sufficient multiplication of the organisms to demonstrate agglutination did not occur in any case until eight hours after inoculation. I stress this quantitative difference in the S.S.S. as later I hope to show its relation to the intoxication and mortality in pneumonia.

How Does the Organism Affect the Individual?

The mechanism of infection—how and where the organism penetrates the body's first line of defences, and how it is carried to its elective organ or tissue has not received from pathologists the attention it deserves. In pneumonia there are three obvious routes by which the pneumococcus may reach the lung—the air-passages, the peritracheal and peribronchial lymphatics, or the blood stream. The spread of infection along the bronchial mucous membrane does not, I think, occur in lobar pneumonia. The idea of a primary septicæmia or bacteriæmia with subsequent localisation in the lung appeals particularly to the clinician (see Kidd, 1912) who is impressed by the sudden onset of the infection frequently with rigor and profound toxæmia, and the finding of the pneumococcus in the blood within the first 24 hours of infection. In our own series the pneumococcus was recovered in two of six patients on whom blood culture was done within one day of the clinical onset of infection. In another patient blood culture happened to be done twice on the day before infection and again within 12 hours of the onset of fever, each time with negative result. On the fifth of the pneumonia Type II. pneumococcus was recovered from the blood.† A lymphogenous infection receives most support from the experimental production of pneumonia in monkeys (Blake and Cecil, 1920). These workers produced lobar pneumonia in 32 out of 37 freshly imported monkeys (*Macacus syrichtus* and *Cebus capucinus*) by intratracheal inoculation of highly virulent Types I., II., and III. pneumococci, whereas subcutaneous or intravenous inoculation resulted in a generalised infection without localisation in the lung. Inoculation into the nose or throat failed to produce any infection. In an examination of the pathology of the experimentally produced pneumonias, Blake and Cecil (1920) found that the pneumococcus first penetrated the walls of the larger bronchi at or near the hilum and that spread of the organism in the pulmonary tissue occurred primarily by way of the perivascular, peribronchial, and septal interstitial tissue and lymphatics, quickly reaching the pleura. Hepatisation began centrally and spread towards the periphery. It must in fairness be stated that other workers (e.g., McLeod and Gordon, see McLeod, 1929) have failed with monkeys to produce experimental lobar pneumonia by intratracheal inoculation.

The most probable explanation of the mechanism of infection then is of an early penetration of the tracheal or bronchial mucosa by the pneumococcus, a lymphatic spread to the lung root and a rapid lobar invasion of the susceptible lung tissue. "Spilling over" of the organisms into the blood stream may occur at any time during the first four to five days of infection, disappearing in patients that recover, but often becoming a true septicæmia in the fatal cases. In 330 patients in our series on whom blood culture was done only on the day of admission, there were 33 per cent. (two out of six) positive on the first day, 28 per cent. on the second day, 42 per cent. on the third day, 22 per cent. on the fourth day, and 15 per cent. on the fifth day; in 24 post-mortem examinations the pneumococcus was recovered from the spleen as well as from the lung in all but one case.

The consolidation of part of the lung leads to respiratory embarrassment, cyanosis, and anoxæmia, and while the mechanism of their production may be complex and still imperfectly understood, these phenomena are at least explicable on physiological grounds. There is, in addition, a varying degree of toxæmia or intoxication and the prognosis of the case depends as much on the severity of the toxæmia as on the degree of cyanosis or anoxæmia. But in spite of many attempts and occasional claims,

† I am indebted to Dr. D. M. Hart, Glasgow Royal Maternity Hospital, for the record of this case.

there has not yet been demonstrated any specific exo- or endo-toxin of the pneumococcus. How then is the obvious intoxication to be explained? If we examine first the experimental evidence, one thing is certain: the pneumococcus is only virulent for laboratory animals when it has a well-developed capsule around it. If the capsule is removed, or if the organism is allowed to disintegrate, virulence disappears. It would seem therefore as if the poison resided in the capsular substance or S.S.S. Toxins as we ordinarily know them are of protein constitution, can produce their lethal effect though separated from the parent organism, and their toxicity is destroyed by heat. S.S.S. is a carbohydrate substance unaffected by heat and injected by itself is absolutely harmless to the mouse or rabbit, animals highly susceptible to the pneumococcus. However, although it is not antigenic, it has the property of combining specifically with pneumococcus antibodies. In an experimental inquiry Robertson and Sia (1927) have shown that animals, such as cat, dog, horse, which are resistant to pneumococcal infection, are so in virtue of natural opsonin. Further, if S.S.S. be added to a mixture of fresh unheated animal serum, plus the homologous avirulent pneumococcus, the latter will be enabled to multiply (Sia, 1926)—i.e., S.S.S. has the power of neutralising opsonin, a natural protector against infection. Incidentally, it must not be thought that the pneumococcus is unique in not having any demonstrable toxin. An example of the same phenomenon among capsulated organisms is afforded by the anthrax bacillus, and it is now known that numerous non-capsulated organisms are also endowed with specific soluble substances—for example, meningococcus, Shiga dysentery bacillus, streptococcus, leptospiræ.

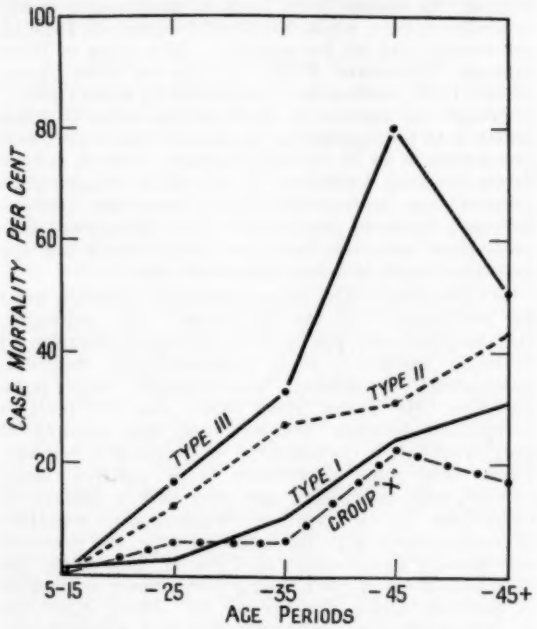

FIG. 2.—Mortality of types of pneumococcal infection in various age-groups.

Regarding the clinical evidence, it is worth while recording first the findings of the earlier workers. Eyre (1909), in an examination of the opsonic index in cases of lobar pneumonia, found that after an initial low period there was a gradual rise during the fifth, sixth, and seventh days in the cases that recovered reaching a maximum at or soon after crisis; the rise was closely paralleled by a rise in the leucocyte count. Lister based his initial observations regarding the specificity of pneumococcal types on the development of specific opsonins in the infected individual, immediately prior to the critical fall of temperature. There was no evidence of opsonin in the blood of fatal cases. Sia et al. (1928) have recently attacked the problem from a similar aspect and have demonstrated the importance of opsonin as well as agglutinin and pneumococcocidal power in the process of recovery. It will be remembered that in their animal experiments opsonin was neutralised by S.S.S. It is true of course that opsonin is only one of the elements in the complex substance known as antibody, but it is also true that it is directly responsible for sensitising the organism for attack by the leucocytes and the leucocytes play an important part in the fight against pneumococcal infection. S.S.S., therefore, may or may not be directly toxic to the cells of the host, but at least it is a powerful antiphagocytic agent and must play a large part in pneumococcal infection. Dochez and Avery have recovered it in the blood and urine of infected persons. Among 88 cases of lobar pneumonia it was present in the urine of 55, of whom 20 died (36·4 per cent.), while it was absent from the urine of 33, of whom 2 died (6 per cent.).

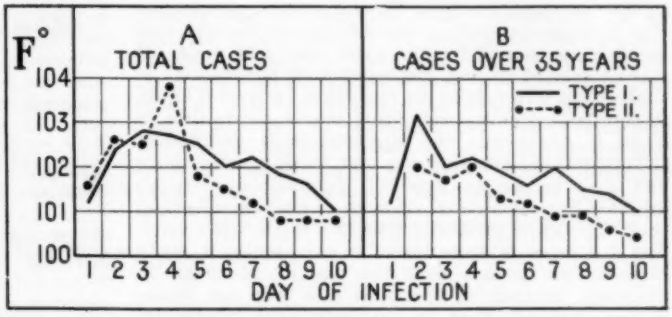

FIG. 3.—Composite temperature charts of Type I. and Type II. infections (each 100 cases).

What is the Patient's Response?

The severity of infection in an individual suffering from pneumococcal lobar pneumonia depends largely on the age of the individual and the type of infecting pneumococcus. I shall consider only the influence of the pneumococcal type at this point. My clinical colleagues were early impressed by certain differences in the response of patients suffering from Types I. and II. pneumococcal pneumonia, and in 1931 we communicated some of our observations (Cruickshank, Fleming, and Montgomery). The death-rate from Types I., II., and III. pneumococcal pneumonia in our series of 1118 non-serum-treated cases was respectively 10·8, 21·5, and 40·9 per cent., and the same difference in mortality from the three types is evident when similar age-groups are contrasted (Fig. 2). An analysis was therefore made of certain clinical and laboratory findings in Types I., II., and III. pneumonia in an attempt to find how far these phenomena would help to explain the differences in the severity and mortality of these infections. There

were too few cases of Type III. pneumonia for it to be included in the full analysis.

(*a*) *Temperature.*—The highest recorded temperature on a four-hourly chart on each day of infection until temperature became normal was noted in each of 100 cases aged 15–70 of Types I. and II. pneumonia. The average temperature on each day for the 100 cases in each group and for the cases over and under 35 was calculated as was the number of pneumonias in each group terminating by crisis and by lysis (Fig. 3). A comparison of the composite charts shows that in Type I. pneumonia the temperature is maintained throughout the infection at a high level, usually above 102° F., whereas, in Type II. pneumonia, after an initial high temperature, evidence of a severe infection, the temperature gradually falls to a much lower level. The difference is accentuated if comparison is made between the groups over the age of 35 (Fig. 3). Although analysis of the pulse-rate was not made, it was noticed that in patients with Type II. pneumonia the pulse-rate did not so closely follow the fall in temperature as it did in Type I. infection. Critical fall in temperature occurred in 71 of the 100 Type I. pneumonias and in 52 of the Type II. cases.

(*b*) *Leucocyte count.*—The prognostic value of the leucocyte count in lobar pneumonia has long been recognised (Table I.). There is both in the natural

TABLE I

Relation of Leucocytes to Mortality in Pneumonia

(Hospital of the Rockefeller Institute)

Leucocytes.	No. of cases.	Mortality per cent.
Under 10,000	29	65·5
10–20,000	163	23·7
20–30,000	177	18·0
30–40,000	76	14·0

infection and in the experimental pneumonia of monkeys a sharp initial rise in the numbers of leucocytes followed by a period of low count and a gradual increase towards crisis in the cases that recover. The only correlation of the leucocyte count with the infecting pneumococcal type which I can discover in the literature is that of Clough (1917) who, in 19 cases of Type I. pneumonia, found an average count of 24,000 and in 8 cases of Type III. pneumonia a count of 11,800. She had only 3 Type II. cases. In the present investigation Fleming has carried out daily leucocyte counts in practically all the cases of pneumonia coming into the Glasgow Royal Infirmary for serum treatment (Fig. 4). The effect of the serum, particularly in Type I. cases, is to bring the curve down more quickly, but the chart shows an appreciable difference in the average leucocyte counts of 45 cases of Type I., 32 cases of Type II., and 8 cases of Type III. pneumonia. There is obviously an antileucocytic substance acting most powerfully in Type III. pneumonia, less so in Type II. and least in Type I. infection.

(*c*) *Bacteriæmia.*—A positive blood culture in lobar pneumonia is generally interpreted as prejudicing the patient's chances of recovery—e.g., at the Hospital of the Rockefeller Institute, in 136 cases with positive blood culture, the mortality was 55·8 per cent., and in 312 cases with negative blood culture only 8·3 per cent., and in our own series of non-serum-treated cases 54 patients had positive blood culture with a death-rate of 44 per cent., whereas 184 cases with negative blood culture had a death-rate of 7·6 per cent. However, the prognostic significance of bacteriæmia varies considerably with the different types. Comparing first the proportion of positive blood cultures in lobar pneumonia due to Types I., II., and III. pneumococci (Table II.), we find that the bacteriæmia is actually most frequent in Type I., then in Type II. pneumonia, and least in Type III. pneumonia. Blake's (1931) figures in a recent paper on Type III. pneumonia were 21 positive

TABLE II

Relation of Bacteriæmia to Pneumococcal Type and to Mortality in Lobar Pneumonia

Institute.	Type.	No. of cases.	Positive.	Percentage positive.	Percentage mortality of +ve bl. culture.	General death-rate.
G.R.I. and Belvidere Hospital	I.	114	37	32·4	15·0	10·8
	II.	136	34	25·0	52·3	21·5
	III.	8	4	—	100·0	40·9
	Gr. X	71	9	12·6	66·6	8·6
Hospital of Rockefeller Institute.	I.	145	50	34·5	26·0	11·6*
	II.	148	49	33·1	73·4	28·5
	III.	55	16	29·0	100·0	43·0
	Gr. X	100	21	21·0	52·3	12·8

G.R.I.= Glasgow Royal Infirmary. Gr.= group.
* Mostly serum-treated.

blood cultures in 116 cases (= 16 per cent.). If we compare these figure with the death-rate ‡ of the different types in lobar pneumonia (Table II., col. 5) mortality would seem to vary inversely with bacteriæmia. Thus Type I. pneumococcus has a greater *invasiveness* and less toxigenicity than Types II. or III. pneumococci.

If now the death-rate in the different pneumococcal types among those with positive blood culture is examined (Table II., col. 4) it is evident that whereas bacteriæmia is of little prognostic value in Type I. pneumonia, it has a grave significance in Types II., III., and Group "X" pneumonia. However, the absence of bacteriæmia when only one blood culture is done need not necessarily be of favourable import—e.g., of 12 deaths from Type I. pneumonia, 5 had a sterile culture, while 5 out of 17 deaths of Type II. pneumonia had no bacteriæmia. The value of blood culture is increased if daily counts are done (Avery et al. (1917), Sutton and Sevier (1917), Koch (1932)), although the number of organisms per c.cm. of blood which is to be regarded as the danger line is variously given from 5 to 20 by these authors. Blood culture is an essential procedure if only as a check, when positive, on serological typing from the sputum. But as a factor in prognosis, I feel it should not take precedence over the leucocyte count which has the additional asset of being a side-room test.

(*d*) *Toxæmia.*—The measurement of toxæmia must be left largely to the physician. My colleague, Dr. Montgomery, has made a clinical evaluation of toxæmia based on such phenomena as delirium, prostration, headache, incontinence, and pulse pressure. He found that there was no positive correlation between toxæmia and the amount of lung involved, or the degree of dyspnœa and cyanosis. There was some correlation with positive blood culture, with advancing age, and with a history of alcoholism or a positive Wassermann reaction. When correlated with the infecting type, the toxæmia was usually more severe in Type II. infections, the difference from Type I. being particularly noticeable in patients under the age of 35. Using S.S.S. as an indicator of toxæmia, Dochez and Avery found the specific substance present in the urine in 57, 71, and 70 per cent. respectively of cases of Types I., II., and III. pneumonia; of the positive cases, 10 per cent.§ of Type I., 50 per cent. of Type II., and 58 per cent. of Type III. pneumonias died.

‡ In this lecture, mortality-rate or death-rate means the case-mortality rate.

§ Mostly serum-treated.

Our experience of Type III. pneumonia is small. Blake (1931) has recently stated that Type III. pneumococcus is a less virulent organism than is generally supposed, the high mortality being due to its attack on older and debilitated individuals—e.g., over 50 per cent. of his 116 cases as compared with 20 and 30 per cent. for Types I. and II. infections were over the age of 40. Our figures in a smaller series of 41 cases agree with his findings, 56 per cent. of Type III. and only 28 and 36 per cent. of Types I. and II. pneumonias being over the age of 35. But while Type III. pneumococcus is less invasive, it is not in our experience less virulent, as at all age-groups the mortality-rate was higher than that of any other Type (see Fig. 2).

In explanation, therefore, of the difference in the severity and mortality of Types I., II., and III. pneumonia it is suggested that the important factor is the amount of S.S.S. elaborated. Type I. pneumococcus, although highly invasive, produces the least amount of S.S.S. and the patient responds briskly to the infection, by high temperature usually falling by crisis, high leucocytosis, and a moderate or mild degree of toxæmia—in fact the classical picture of lobar pneumonia. Type II. pneumococcus, elaborating more S.S.S., produces, particularly in patients over 35 years of age, a much more severe infection; the patient is more toxic and less reactive. Type III. pneumococcus, although it produces most S.S.S., has little invasive power, and is therefore a rare cause of lobar pneumonia, but infection when it occurs is usually very severe and often fatal.

An analysis of 60 cases of Group "X" pneumonia shows that the infection occurs more in the young than in the old, the pneumonia is quite a typical one with temperature maintained around 102° to 103° F., the infection is often mild and terminates frequently by lysis (63 per cent. in the series).

How is the Infection Overcome?

The varying duration of the fever in different infections has never been satisfactorily explained. Why should typhoid fever continue for 3 to 4 weeks, typhus for 12 days, erysipelas 7 to 8 days, and undulant fever for months perhaps? In this respect primary pneumococcal pneumonia is a specific infection which differs in some degree from streptococcal or staphylococcal or influenzal pneumonia (Cole, 1928). The mechanism of the critical fall of temperature in lobar pneumonia has been variously explained. McLeod (1929) who has recently discussed the matter is inclined to attribute considerable importance to the local processes in the lung in causing the death of the pneumococcus. We have repeated many observations of English and American workers, and have usually found that antibodies develop in the blood of the patient at or near crisis in those who recover and are absent in fatal cases. There have been exceptions—e.g., the finding of protective antibody in the presence of septicæmia and its absence until after the clinical crisis. In spite of these anomalies, the termination of the infection is probably due primarily to a general humoral antibody response. An analysis of the duration of infection supports this opinion. In 100 cases each of Types I. and II. pneumonia, and in 60 cases of Group "X" pneumonia, the duration of pyrexia was respectively 7·6, 7·7, and 7·5 days. When the duration of fever in cases under the age of 35 was compared with that of those over 35 it was found to be 7·4, 7·4, and 7·0, as against 8·4, 8·1, and 8·4 days. It seems obvious that the antibody mechanism responds more briskly and more quickly overcomes the infection in the young than in the old.

Another aspect of pneumococcal pneumonia which has been used as argument by those who do not believe that the general antibody reaction is responsible for arresting the infection is the tendency to repeated attacks. We have records of five instances of second attacks of pneumococcal lobar pneumonia at an interval of six months or more after the previous infection. In each case the second attack was due to a different serological type of pneumococcus from that of the first. In a sixth case a Group "X" pneumococcus was recovered both times and was not further differentiated. A seventh case seemed to be the exception to the rule. This patient was readmitted a year after an attack of Type II.

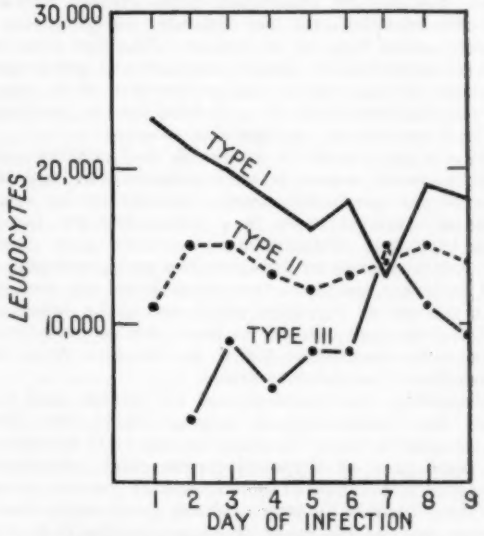

FIG. 4.—Leucocyte count in infection of the three types at various stages of the illness.

pneumonia and again Type II. pneumococcus was recovered from his spit. Luckily for us, unluckily for the patient for he died, he developed an empyema from which a hæmolytic streptococcus was recovered. We had the further consolation of having proved this man to be a chronic carrier of Type II. pneumococcus during the period between his first and second attacks, and, of course, he was still harbouring the organism when he was readmitted. These second and third attacks serve, I think, to show the specificity of the pneumococcal infection and indicate not a lack of immunity to the infecting pneumococcus but a susceptibility to pneumonia. It may be remembered that Hedley Wright (1929) found a rabbit still resistant to Type I. pneumococcus ten months after a single injection of the same organism.

Is there a Specific Antidote?

The treatment of lobar pneumonia with anti-pneumococcal serum is no new development, and we owe much to American workers for their persistent efforts to make the treatment of pneumonia with specific antisera a practical possibility. Progress in recent years has been mainly concerned with the production of a refined and concentrated antiserum of high potency. The present obstacles to its wider use are its specificity which requires a bacteriological typing of the pneumonia, its expense and the need for intravenous medication, its doubtful value in pneumonia other than Type I. infection, and the difficulty of getting cases early for treatment when the serum is likely to be most effective. Let us deal

seriatim with each of these objections, taking the last first.

It is generally agreed that administration of serum is contra-indicated after the fifth day of illness. In an analysis of the day of illness on which the patient was admitted to hospital, in 200 cases of Types I. and II. pneumonia we found that 70 per cent. were admitted within the first four days of infection; a commendable achievement when it is remembered that the cases were mostly derived from the poorer classes.

The value of antiserum in the treatment of Type I. pneumonia is now undoubted. There is less convincing evidence of its efficacy in Type II. pneumonia. Two factors are responsible—the greater severity of the infection and the difficulty of producing a highly potent Type II. antiserum. The first difficulty can be overcome by earlier diagnosis and much more massive dosage, while the production of a potent Type II. antiserum is being tackled by the producers with, I understand, considerable success.

The expense both of producing and refining anti-pneumococcus serum is very considerable, and the cost of the product cannot commercially be much reduced, even if there is a wider demand for it. This high cost of antipneumococcal serum is a real obstacle to its use by public bodies and practitioners, and it is not particularly creditable to our country that the use of remedies which are to be beneficial to the community should be made almost prohibitive because the production has to be left entirely to the enterprise of commercial firms.

Regarding the specificity of the serum and the need for bacteriological typing, there are two advantages to offset the disadvantage. If we accept the usefulness of Type II. serum and administer primarily a bivalent (Types I. and II.) serum, there are three chances in four of doing good, since about 75 per cent. of the cases of lobar pneumonia in this country are due to Types I. and II. In addition, pneumococcal typing can now be effected in the majority of cases within one to six hours of the diagnosis, either by direct typing from the sputum (Armstrong (1932), Logan and Smeall (1932), Fleming (1933)) or by Sabin's rapid mouse method (Sabin (1929), Cruickshank (1933)). Furthermore, a knowledge of the infecting type is of considerable prognostic value to the physician, whether or not serum is being given. Incidentally, recent work by Day (1933) raises a hope that it may soon be possible to prepare a pan-pneumococcal antiserum.

The results from the serum treatment of lobar pneumonia have been recently and adequately discussed (Cole (1929), Cecil (1932), Park (1930), Cowan, Harrington, et al. (1930, 1932, 1933)). The therapeutic use of a specific antiserum may be expected to result in amelioration of the symptoms, shortening of the infection, and saving of lives. The importance of the first two uses must not be minimised or too much stress laid on the comparative mortality of groups of serum-treated and non-serum-treated cases. Such a comparison is only possible with very large numbers since there are so many variables influencing mortality in pneumonia (see Table III.). Amelioration of the toxæmia is a clinical evaluation—I quote the opinions of experienced physicians. "In Type I. pneumonia the results of serum treatment are excellent; in Type II. pneumonia the effect of serum while not so striking as in Type I. cases is nevertheless definite" (Cecil). "Serum and oxygen should be available for the treatment of pneumonia in every hospital" (Cowan, Harrington, et al.). The shortening of the infection by the use of antiserum in Type I. and less surely in Type II. pneumonia may be most readily appreciated by examination of the temperature charts of a consecutive series of treated patients (see Table IV.). The question is sometimes raised as to whether the serum exercises a non-specific effect such as any foreign protein might do. A considerable number of Group "X" pneumonias in our series were given serum, partly to test this possibility. There was no marked effect either in shortening the infection or in influencing the mortality (Table IV.).

TABLE III

Mortality-rate for Serum-treated and Non-serum-treated Cases of Lobar Pneumonia (Types I. and II.)

Collected—U.S.A. and Britain

Type.	Serum-treated.			Non-serum-treated.		
	Cases.	Deaths.	Mortality per cent.	Cases.	Deaths.	Mortality per cent.
I.	547	94	17·3	477	148	31·0
II.	415	139	33·4	367	159	43·3

TABLE IV

Duration of Pyrexia in Days of Serum-treated and Control Cases of Lobar Pneumonia: aged 15–70 years

—	Serum-treated: G.R.I.	Control cases: Belvidere Hospital.
Type I.	4·7 days (40 cases)	7·6 days (100 cases)
„ II.	6·6 „ (40 „)	7·7 „ (100 „)
Group X	6·3 „ (38 „)	7·5 „ (60 „)

Summary

The serological determination of the pneumococcal type in lobar pneumonia has in the past been regarded more of academic interest to the bacteriologist than of practical importance to the clinician. In the foregoing lecture I have tried to indicate that, apart altogether from serum treatment, a knowledge of the type of infecting pneumococcus is of considerable prognostic value. Quantitative as well as qualitative differences in the capsular or specific soluble substance of Types I., II., and III. pneumococci have been shown to exist, and the intimate association of the pneumococcal soluble specific substance with the degree of toxæmia has been stressed as explanation of the difference in the severity and mortality of Types I., II., and III. pneumonia. Because of the antileucocytic effect of this substance the leucocyte count is believed to be as valuable in prognosis as the presence or absence of bacteriæmia. Infection is overcome naturally by a general humoral antibody response. It may be considerably shortened in Type I. pneumonia and less surely in Type II. pneumonia by the use of specific antipneumococcal serum.

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EPIDEMIOLOGY APPLIED TO SCHOOL LIFE *

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Medicine has advanced considerably during our lifetime along certain lines—e.g., medical and surgical treatment—but progress has been slow and erratic in the prevention of infectious disease. We are using to-day practically the same methods of control as when bacteriology and the study of immunity were in their infancy; the same procedure of notification, isolation, and disinfection as that to which our grandfathers pinned their faith. Yet there is no excuse, for epidemiology, whether statistical, experimental, or field study, has made great advances and we know to-day much more than we did of how infectious diseases are bred, how they behave, the conditions which help or hinder their spread, and how they can be prevented. As members of this association, we are responsible for the health and physical welfare of a number of young people, living a community life and therefore exposed to the forces which govern epidemics. On our study of the laws of epidemiology we have to base our rules for the control of infection in the schools.

Quarantine

Quarantine is the source of all our preventive methods against the spread of infectious diseases. It took its origin from the sea, and the application of its principles was mainly to shipping and the movements of pilgrims and troops from one country to another. The dominating principle in modern as opposed to the older quarantine is that it must be a sieve and not a dam. Its art consists in regulating the openings so as to hold back certain infections, but to permit all else to pass through. In practice, quarantine has failed in the case of droplet-borne diseases, such as influenza, and in diseases such as poliomyelitis where subinfections and carriers are numerous. Diseases, such as small-pox and cholera, against which a solid immunity can be effected; those, such as pneumonia and plague, in which the disease can be easily identified; and those transmitted by rats, lice, or mosquitoes are capable of complete control.

Four Interacting Factors

Every epidemic is influenced by the interaction of four variable factors. These are:

1. The reservoir factor,
2. The transmission factor,
3. The infecting factor,
4. The immunity factor,

and the character and progress of the epidemic depend on the dominant factor. This is the basis of C. A. Gill's quantum theory of infectious disease.

Karl Pearson taught (1911) that an epidemic could best be studied by the use of curves, and he introduced the term "*epidemic wave*" in relation to frequency distribution curves. He showed that the number of cases affected in an epidemic rises, more or less rapidly, to a maximum or peak, and then falls with a roughly proportionate rapidity, to the normal or endemic level. J. Brownlee (1905–09), in studying epidemics of small-pox and measles, showed that these waves varied considerably according as to whether the immunity peak was prominent or not. When this was insignificant an epidemic—e.g., variola major—would exhaust itself only after the whole community had been affected; where the immunity factor was dominant the outbreak either did not occur or came to an end long before the susceptible population had become exhausted. The first phenomenon he describes by a loss of susceptibility curve and the second by a loss of infectivity curve. These phenomena are of particular importance in diseases such as diphtheria and scarlet fever, where the immunity in city populations is very high. It has also been demonstrated that the immunisation of a comparatively small proportion of the population is a powerful preventive in outbreaks of variola major, scarlet fever, and diphtheria.

The dominant factor is that which saves us from epidemics of such diseases as poliomyelitis and cerebro-spinal fever. There are, in an urban community, so many carriers in the population that they keep the immunity potential so high that the virus either does not produce infection or, if it does, only in a very mild and so unrecognised form. This salting of a community continues, provided a certain number of carriers exist in that community. It can be clearly demonstrated in such diseases as scarlet fever and diphtheria, where it can be tested by the Dick and Schick tests. Individuals may be immunised artificially to withstand attacks of these diseases. P. Stocks has shown this immunity to exist in such high velocity diseases as measles and whooping-cough.

Again, S. F. Dudley has shown that apart from immunity an individual has the power of ridding himself of infecting material just as he is capable of becoming infected by it. There is thus set up in a person exposed to a source of infection a struggle between these factors. If the rate of infection is the more rapid the person is finally overcome by a dose of infection capable of affecting his system and so, after a definite period called the incubation period, he will develop the symptoms of the disease. The term "epidemic potential" has been introduced to express the balance between the infectivity of the organism and the susceptibility of the individual or community.

Improved Machinery

The question is how far have we benefited by these discoveries, and in what way we have improved our

* Abstract of presidential address to the Medical Officers of Schools Association on March 10th, 1933.

Dr. Cruickshank: Bibliography

(*Continued from previous page*)

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machinery for the control and prevention of infectious diseases in communities like cities, hospitals, day and residential schools.

First, dealing with the actual patient, the reason a person suffering from diphtheria or scarlet fever was originally sent to an isolation hospital was chiefly for the safety of the community, for it was considered essential to isolate cases to prevent outbreaks. We know now that, speaking generally, whether the sufferer is treated at home or in a hospital will make no difference to the spread of the disease. Isolation hospitals are regarded now as primarily for the satisfactory treatment of the patient, and not for the prevention of the spread of the disease in the community.

Secondly, as regards contacts, that is to say, those persons who have come in contact with the sufferer during the period in which he is capable of transmitting the infecting agent, epidemiologists have taught us that there are many factors which decide whether the contact will develop the disease or not, and that the odds are great that he will not be infected. Experience goes to show how really few contacts actually contract the disease, even when they have been intimately exposed to it. We now classify diseases in accordance with the striking distance of the infective agent and the probability of its succeeding in striking. For instance, in London, about 93 per cent. of children have actually suffered from measles by the time they leave school, but only 10 per cent. at most will have been affected by scarlet fever.

This variation is no doubt due to what Stocks calls the latent immunising factor or salting of a community when the disease happens to be endemic. This applies to some diseases more than others—e.g., scarlet fever, diphtheria, poliomyelitis, cerebro-spinal fever, diseases which are always more or less endemic in this country. We know that the immunity of a city population is very high in this country for diseases which are endemic. For instance, when carrying out the Schick test for diphtheria in our residential schools or in a community such as that in Becontree, it is found that the immunity-rate may be as high as 60 per cent.

This working of nature to combat the contraction of infectious disease has not been sufficiently recognised or allowed for when drawing up preventive measures.

Thirdly, so much emphasis has been placed on the danger from contacts that I find it is quite a common belief amongst many, whether doctors or the lay public, that a person who is incubating a disease is a danger to the community. In London, on the other hand, for many years children in infant schools have been allowed to attend school during the period when they may have been incubating measles and have only been excluded on the ninth day, that is, when the coryzal symptom was due and they become infectious.

Fourthly, there are the so-called carriers of infection. Even they have their grades and may be divided into the active carriers or the actual distributors of the disease and the passive carriers who, according to Dudley, are the persons who are incapable of getting rid of the infection so long as they remain in active contact with the distributor. The latter, if susceptible, will ultimately develop the disease if they remain sufficiently long in touch with the distributor and so may become a danger to others, but, if they belong to the large percentage of the immune, they will usually be found harmless and free themselves from germ carrying after a day or two away from the distributor.

Fifthly, much attention has been given to the value of disinfection, the reason being that fomites were supposed to be an essential part in the spread of disease. This we now know is not the case. Many public health authorities have actually given up terminal disinfection.

School Closure

School closure is adopted on the assumption that an infectious disease, having occurred in a community, is spread from child to child through the association of the healthy (but susceptible) with the unhealthy, whether sufferer or carrier, and that the dispersion of the members of the school will prevent the continuance of that spread. It also assumes either that the school is the main factor in the spread or is at any rate the chief cause of keeping a number of susceptibles together. Closure in other words is a confession that the sources of infection and the causes of spread cannot be discovered and so be suitably dealt with.

School closure is still being carried out in small or sparsely populated areas, not so much on the ground that it is a potent means of stopping the spread of infection as because these places have not the doctors or school nurses to carry out the necessary surveillance. It is a measure which has long ago been discarded in schools where an intelligent method of inspection, surveillance, and control has been instituted. In London, for instance, no Council school has been closed for the last 20 years, and even previous to that, where schools were closed by old-fashioned health officers, it was against the advice of Dr. J. Kerr, who was then school medical officer. Even in diseases so diverse as small-pox and measles home contacts are encouraged to come to school, for we know they are under better supervision there than at home.

In the Council's residential schools a system of surveillance now prevails and this has displaced quarantine. School doctors and school committees were at first strongly opposed to this method of control, but many of them have come to see that it is the only logical method. If the consensus of opinion of the world's epidemiologists is in favour of surveillance as opposed to quarantine in international maritime control, surely surveillance must be the right policy in our domestic affairs.

The observations of Dudley, Glover, and others have shown that, in an urban community like ours, a high standard of immunity exists, that this is due to a fairly high state of infective pressure, and that, although this is particularly so in diseases like scarlet fever, diphtheria, cerebro-spinal fever, and poliomyelitis, it can even be shown to exist in high velocity infections like measles and whooping-cough. Security depends on this high standard of immunity which, in its turn, depends on the presence of carriers of disease or of mild attacks in the community. If we attempt to interfere with this condition of equilibrium we are doing no useful service to the community. We are, in fact, sending potential carriers to other communities with low protection and finally promoting a further outbreak in the original community when they return.

Not only are unnecessary hardships placed on parents in keeping children away from school on account of hypothetical dangers associated with contact with infection, but when the children are at home such attention is not given to the discovery of early symptoms (even of common ailments like colds and sore-throat) as will lead to their segregation and the calling in of a doctor. If the school is kept open no harm should follow, given efficient supervision. If it is closed and the children dispersed, serious harm may result from delay in treating the sufferer and from allowing the disease to spread.

ACTINOMYCOSIS

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The analysis of 29 consecutive cases of actinomycosis seen in the London Hospital over a period of five and a half years presents certain features which may prove of general interest. In every case the presence of the streptothrix was verified by the bacteriological examination of pus obtained at operation or at necropsy.

In some text-books, even to-day, actinomycosis is supposed to be caused by two different organisms, *Actinomyces hominis* and *A. bovis*. The former is an acid-fast, aerobic streptothrix commonly found on grasses; the latter, a non-acid-fast anaerobic streptothrix which has not been found outside man or animals. Modern workers, however, do not agree with this view, and ascribe the disease solely to the anaerobic variety. This variety was present in all the 29 cases which are the subject of this paper.

If the disease is indeed caused only by the *A. bovis*, the legend that actinomycosis is connected with the chewing of straws must be abandoned. *A. bovis* has been found by recent workers in the tonsils of healthy persons, and in carious teeth, and the view is now held that infection takes place from organisms in the alimentary tract (Colebrook [1]). In some cases, no doubt, the infection may be initiated by injury produced by foreign bodies, but there seems no doubt that the association of foreign bodies with the disease has been overstressed. In the present series nothing of this sort has been found.

A. bovis is always associated with other bacteria. Often this association consists of gross infections, as, for instance, with the colon bacillus, but in many cases the actinomycotic infection appears to be pure. On more minute examination, however, it is found in these cases that a minute bacillus is also always present. This bacillus, *Bacillus actinomycetum comitans*, constitutes the bulk of the Gram-negative material observed in sections of the actinomycotic granule. The constant presence of these associated organisms is important as explaining how the infection can be initiated. Fildes [2] has pointed out in the case of tetanus that the associated bacteria reduce the oxygen tension in the tissues to a limit which will allow the anaerobic spore to germinate. The associated bacillus in actinomycosis may carry out the same function.

In this series of 29 cases none of the patients was under the age of 10, but most (21 cases) were under the age of 40, and 7 of these were under 20 years of age. Clinically the infections may be divided into two main groups: the superficial group, which includes the cervico-facial variety and subcutaneous infections of the limbs; and the deep group, which includes the thoracic and abdominal cases. In the first group the infection does not endanger life, but in the second it only too frequently proves fatal. In fact the prognosis of actinomycosis depends in all cases upon the anatomical site of the lesion. If the lesion is near the surface, its granular and pustular content is readily discharged, oxygenation is possible, and the patient recovers. If, on the other hand, the lesion is deeply placed, as in the liver or vertebræ, or if it is separated from the surface of the body by a limiting membrane such as the pleura or peritoneum, free drainage is not easily established, and the patient may succumb from extension of the disease or from amyloid disease. There does not appear to be any intoxication, as in the case of infection by other anaerobic organisms. Of the 29 cases 6 proved fatal, and of these all except one were of the deep type. The exception was a patient with cervico-facial actinomycosis who died under an anæsthetic.

ANATOMICAL INCIDENCE

The anatomical incidence of the infection in the 29 cases was as follows:—

1. *Superficial type.*—(*a*) Cervico-facial, 17 cases: (1) submaxillary region, 12 cases; (2) parotid region, 3 cases (1 death under anæsthetic); (3) sternomastoid region, 2 cases. (*b*) Subcutaneous infection of lower limbs, 2 cases.

2. *Deep type.*—(*a*) Abdominal, 8 cases (3 died). (*b*) Thoracic, 2 cases (both died).

In all the cervico-facial cases trismus was a presenting symptom and appeared to have very little relation to the size or duration of the swelling; in two cases the trismus persisted long after the swelling had completely disappeared. The submaxillary type of the disease presented, in the early stages, the features of a typical alveolar abscess. In most cases the teeth were carious, and in three cases there was a history of extraction of a tooth before the onset of the swelling. One case in which the teeth were all healthy requires special mention.

This was of a girl, 10 years of age, who was first seen with a circumscribed abscess the size of a pigeon's egg in the left submaxillary region. There was marked trismus, and both tonsils were enlarged, but the left especially. The teeth were examined by a dentist, who reported "no caries present." The abscess was incised and the report on the pus was that granules were present, which proved to be colonies of the streptothrix. A swab from the left tonsil showed the presence of "long filamentous anaerobes." The origin of the infection from the tonsil therefore seems probable. Potassium iodide was administered in increasing doses until the child was taking grs. 60 in a day, and in a month the wound had healed, leaving a firm scar. Another patient in this group developed a secondary abscess in the temporal region on the same side. Both were incised, and both showed the presence of the streptothrix.

In the parotid variety of the disease the trismus was even more marked. In one case, pressure on the gland caused a discharge of pus from Stensen's duct. This type of the disease was much more resistant to treatment than the submaxillary.

The two sternomastoid cases are of interest in that in each case an encapsulated mass was removed at operation; in one case from the sternomastoid muscle, and in the other from the structures lying deep to that muscle. Each case showed actinomycosis, the first of muscle and lymphatic gland, the second of lymphatic gland alone. Both healed by first intention, although one received no treatment with iodides.

Both the cases of subcutaneous infection of the lower limbs followed injury, one being diagnosed as an infected hæmatoma. Both showed a tendency to spread superficially and to form fresh sinuses.

In the abdominal type the infection started in the region of the cæcum in all cases except one; this was an abscess of the left iliac fossa following a perforated duodenal ulcer. Three patients in this series died, one could not be traced, and the remainder were still under treatment. The importance of the routine examination of pus in abdominal conditions is illustrated in a more recent case, not consecutive, and therefore not included in this series.

The patient, a girl of 22, was admitted to hospital with general peritonitis, and so ill that only suprapubic drainage under gas and oxygen was possible. After two weeks she developed a subdiaphragmatic abscess which was also drained, and it was not until after the resection of a rib for empyema that the pus was sent for examination and showed the presence of the streptothrix *A. bovis*.

Both the thoracic cases were characterised by a steady spread of the disease in spite of treatment. Subcutaneous abscesses appeared, and one patient showed at one time 14 abscesses, all about 1½ in. in diameter, over the lower part of the back. In the same patient the streptothrix was present in the sputum.

POST-MORTEM RECORDS

Owing to the chronicity of the disease patients suffering from actinomycosis are frequently discharged from hospital before death. For this reason post-mortem records were available in only one of the five deaths in this series (No. 9 in the following summary). Therefore, in order to investigate the mode of death in actinomycosis an examination was made of the pathological records of patients dying from the disease prior to this series. The following are extracts from these records. The first eight cases represent the deaths which occurred in the London Hospital over a period of four years.

CASE 1 (1912).—Actinomycotic pyæmia. Abscess (1 cm. diam.) in ileocæcal valve. A few small submucosal abscesses in ascending colon. Thin pus and organising fibrin throughout peritoneum. Purulent thrombosis of right branch of portal vein. Fibrotic honeycomb abscess in right lobe, and a few discrete abscesses in left lobe of liver. Small subpleural abscesses in all lobes of lungs. Inflamed spleen. Operation: appendicectomy four days before. Appendix 4·5 cm. long; fibrotic obliteration of lumen in distal 2 cm.

CASE 2 (1912).—Actinomycotic pyæmia. Submucous abscesses in cæcum, last inch of ileum, ascending colon, hepatic flexure, and jejunum adherent thereto. Chronic abscesses in right iliac and lumbar muscles. Focal purulent peritonitis in right iliac fossa. Large groups of abscesses in right lobe of liver. A few subpleural miliary abscesses in lower lobe of right lung. Grey-red inflamed spleen. Operation: appendicectomy three months before, "appendix found in hard tangle of adherent growth." Appendix with focal constriction by fibrous scar of mucosa and submucosa.

CASE 3 (1912).—Actinomycotic pyæmia. Large submucous hæmorrhagic areas and a few small ulcers in cæcum. Numerous submucous hæmorrhagic abscesses throughout colon and in lower 18 in. of ileum. Hæmorrhagic cellulitis of bed of cæcum. Abscess in right psoas and iliacus. General organising fibrino-purulent peritonitis. Subpleural purulent inflammation in base of lower lobe of right lung. Rounded group of walled abscesses (largest 3 cm. diam.) in right lobe of liver. Abscess within and purulent infiltration of bed of right suprarenal body. Submiliary abscesses in left kidney. Miliary abscess in apex of urinary bladder. No enlargement of spleen (3½ oz.). Operation: appendicectomy three months before. Actinomycotic granulation tissue found in peritoneum at site of appendix.

CASE 4 (1912).—Actinomycotic pyæmia and lardaceous disease. Right psoas and iliacus riddled with abscesses. Extraperitoneal pelvic abscess. Large abscess in left psoas. Pus in right hip-joint. Cutaneous sinuses in right groin and appendix region. Submucous abscess in ileum 2 in. above termination; close to this a perforation of ileum into retroperitoneal tissues. Focal fibrino-purulent peritonitis in right iliac region and pelvis. Scar in cæcum of appendicectomy. Miliary subpleural abscesses throughout both lungs. Abscess in spleen. General amylosis of liver and suprarenal bodies. Sago-waxy spleen. Operation: appendicectomy ten months before.

CASE 5 (1912).—Actinomycotic septicæmia. Hæmochromatosis. Fibrous scar in proximal end of appendix. Peritoneal adhesions round appendix and cæcum. Numerous groups of actinomycotic abscesses in liver. Reticular fibrosis and great hæmosiderosis of liver. Deep blue pigmentation of lymphoid tissue throughout intestines. Slight chronic inflammation and extensive hæmosiderosis of spleen.

CASE 6 (1913).—Actinomycotic cerebro-spinal meningitis. Purulent infiltration and destruction of tissues in right false pelvis, extending to and involving the right lobe of the diaphragm and the lumbosacral vertebral muscles. Purulent erosion of posterior surface of bodies of third, fourth, and sixth lumbar vertebræ. Extrathecal pus in lumbosacral portion of spinal canal. Thick gelatinous pus in subarachnoid space of cord and brain. Slight chronic inflammation of spleen.

CASE 7 (1915).—Actinomycotic septicæmia. Perforated ulcer (1·2 cm. diam.) in cæcum. Abscess in right false pelvis. Almost complete destruction of right iliacus muscle. Small abscess in adherent fimbriæ of right Fallopian tube. General organising fibrinous peritonitis. Direct extension of abscess from right false pelvis under Poupart's ligament and over lesser trochanter of femur into thigh. Abscesses in intermuscular septa of outer surface of right thigh and leg. Red, diffluent inflamed spleen. Operation: appendicectomy 13 days before.

THORACIC TYPE

CASE 8 (1913).—Death during anæsthesia. Acute superimposed on chronic rheumatic endocarditis. Actinomycotic abscess in muscles of back from right ninth to twelfth ribs, and in subcutaneous tissues from ninth rib to right iliac crest. Purulent infiltration and great thickening of retropleural tissue from fourth rib to first lumbar vertebra. Dense adhesion between pleuræ over postero-inferior angle of lower lobe of right lung. Purulent infiltration of subjacent lung to depth of 1·5 cm. Grey inflamed spleen. Operation wound exposing eleventh right rib.

CASE 9 (1928).—Heart failure. Actinomycotic pericarditis. Area of fibrosis (2 × 1·5 cm.) containing multilocular abscess (1 cm. diam.) in centre of anterior margin of upper lobe of left lung. Area (8·5 × 5 × 4 cm.) of organising purulent broncho-pneumonia in lower part of anterior margin of upper lobe of right lung. Continuous with these a dense fibrosis containing chronic abscesses in the anterior mediastinum below level of fourth rib. Extension of dense fibrosis with more recent abscesses to the intercostal and subcutaneous tissues from the second to fifth costal cartilages and to the pericardium. Surface of superjacent skin studded with ulcers exuding pus. Numerous minute and one large abscess (9 × 5 cm.) in thickened adherent pericardium. Œdematous "back pressure" spleen.

It will be seen from these pathological findings that actinomycosis causes death in three ways: (1) by direct extension to and destruction of vital structures; by (2) generalised pyæmia; or by (3) amyloid disease. Although the gut was perforated in two cases, there was never fæcal peritonitis, and perforation was never a cause of death.

It is commonly stated that the lymphatic glands are not affected in this disease (Zachary Cope). That the glands do become infected is shown by the two sternomastoid cases quoted above. But the lymphatic glands do appear to be resistant and in most cases unaffected.

Spread of the disease takes place in two ways: at first by direct extension alone, and later, when abscess cavities have formed, by the blood stream. The degree of spread possible by direct extension alone is well illustrated in Case 6. It must be emphasised that these methods of spread apply to the deep variety only. In the superficial cases extension is slow, and infection by the blood stream with the formation of "metastatic" abscesses does not occur.

CONCLUSIONS

Human actinomycosis appears to be invariably an infection with the non-acid-fast anaerobic streptothrix *A. bovis*. The superficial variety of actinomycosis occurs more commonly than is usually supposed. In cervico-facial cases, before the formation of pus, trismus is the most important sign.

Early diagnosis by a bacteriological examination of pus in all cases of alveolar abscess and early treatment with iodides will prevent the terrible scarring and repeated relapses associated with the disease. If a test-tube containing actinomycotic pus is tilted the granules are visible to the naked eye as greenish-grey specks adhering to the glass. Even, therefore, when a routine bacteriological examination of all pus is impossible, this method of tilting the test-tube and examination through a hand lens would indicate the suspicious cases which need fuller investigation. In the deep variety there is such a high mortality that a routine bacteriological examination of pus in cases of empyema, appendix abscess, and subdiaphragmatic abscess is imperative. Where cases are allowed to suggest the disease by their very chronicity the disease has usually spread beyond human aid.

In both types of the disease adequate drainage, with the resulting increase in oxygen tension of the part affected, and massive dosage with iodides appear to give the best results.

Prognosis depends upon the anatomical site of the lesion and early recognition of the disease.

My thanks are due to the surgical staff of the London Hospital for permission to publish these cases, and especially to Mr. Hugh Cairns, who was in charge of the isolation block at the time of the investigation. I am also indebted to Dr. Paul Fildes for his advice on the bacteriology, and to Prof. H. M. Turnbull for permission to make use of the post-mortem records, and for his advice.

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THE GRASS-POLLEN ANTIGEN FOR HAY-FEVER DESENSITISATION

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I.—POLYVALENCY

WHEN in 1908 the late Leonard Noon and I began experiments to see if inoculated doses of a grass-pollen extract would in any way modify (or might even cure) hay-fever symptoms, we were naturally faced with the problem whether the extract from any grass-pollen would do, or whether we ought to get extracts from a number of the grasses, and if so, which of them? This was a vital point because there are 41 genera, 108 species, and innumerable varieties of grasses in the British Isles alone. The pollen of any one of them will fly for 30 or 40 miles on a brisk summer breeze, therefore the air-passages of any hay-fever patient must in the course of nature be subjected to the action of a great variety of grass-pollens.

EXPERIMENTS ON GRASS-POLLEN

First phleum testing (1908).—To settle this point we tested a number of hay-fever subjects with three extracts from different grass-pollens—namely, *Phleum pratense*, *Alopecurus pratensis*, and *Poa annua*. We argued that if these three grasses did contain different antigens, presumably some patients would react to one and others would react to another; or at least it might be presumed that one of these pollens would react more strongly on some of the patients, while another pollen would react more strongly on others. As a fact, we found that if any patient was sensitive to one he was sensitive to all three, and that with these particular extracts the strongest reaction was always given by phleum, the next strongest by alopecurus, and the least by poa. Arguing from these three pollens to all grass-pollens, we decided that phleum would serve as an antigen to all hay-fever cases—i.e., it was immunologically "polyvalent." So we used phleum.

A year or two later, after the untimely death of Noon, I corresponded with Dunbar, of Hamburg, who informed me that he was using rye pollen as an antigen, and very courteously sent me a supply. Testing this against *Phleum pratense* I came to the conclusion that they contained the same antigen.

Second phleum testing (1920).—In the course of years other workers entered this field of investigation and many of them advised that patients should be tested to see to which particular grass they were sensitive, thinking that variety of sensitisations might account for failures in treatment when using phleum alone. Also it was thought by them that the differing cutaneo-reactions of the various grasses indicated differing antigens. The old problem was therefore re-examined in my laboratory soon after the war, with the amplification of the experiment by two new pollens, *Dactylis glomerata* and *Anthoxanthum oderatum*. Again it was found that if any patient reacted to one he reacted to all grass-pollens; and, within the limits of accuracy of the experiment, no particular grass-pollen gave a relatively strong reaction with one patient and a relatively weak reaction with another patient. It was also observed that cured patients—i.e., those who had previously been (for therapeutic purposes) heavily inoculated with *Phleum pratense* for several years and who had thereby lost their reaction to phleum—had lost their reaction also to the other grasses. This result might have been anticipated, because they could not have been cured unless they had failed to react spontaneously in response to all the varieties of grass-pollen grains that the atmosphere might send them during the hay-fever season. Thus the polyvalency of phleum seems to be reaffirmed.

Third phleum testing (1932).—However, writers of books and papers on hay-fever continued to suggest that it was desirable to test the patient to a variety of grasses.[1] One such writer stated that holcus and dactylis certainly yielded different antigens from that which could be extracted from *Phleum pratense*. I therefore decided to make another and more elaborate testing, and to test especially these two suspect grasses.

During the summer of 1931, beside the customary pollen from phleum, pollen from seven other grasses was collected and extracted for testing purposes, and a special quantity of dactylis and holcus was collected for heavy immunisation. Work during 1932 showed that no hay-fever patient who reacted to any *one* of these pollens failed to react to all eight of them; and, within the limits of the experiment the more powerful pollen extracts reacted powerfully on all, the less powerful reacted less powerfully on all. Thus our original experiment was confirmed again. Furthermore, it was observed that heavy desensitisation with extracts of phleum, dactylis, or holcus, or with any combination of these three, when carried far enough, not only reduced and finally obliterated the skin reactions to the particular pollen that was being used as an antigen, but abolished them to all the other pollens also. All this is shown graphically in the accompanying Figure. This result was found whenever the doses were carried high enough, and was supplemented by the fact that any patient whose skin reactions had wilted under the influence of massive doses of any of these three antigens suffered no trace of symptoms from the naturally occurring pollen-cloud at midsummer.

One further test I am still carrying out which bears on the polyvalency of phleum, &c., and that is to see how rapidly the various skin reactions return after they had become obliterated by treatment last spring or summer. So far as I have had time to test, the skin reactions from no one of the pollens returns more quickly or more slowly than the others do.

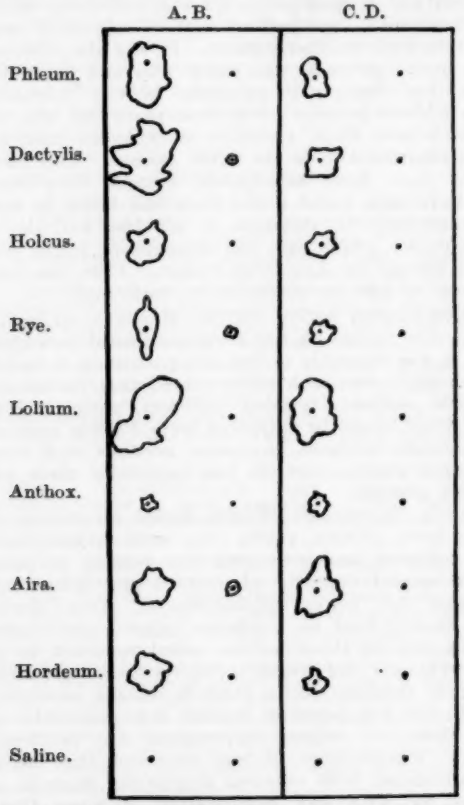
If there is any difference of antigen between the different grasses it has not been detected by me, and

[1] The extracts used for these tests usually come from U.S.A.; it should have caused misgivings that occasionally the species of grass selected in this way for use as the antigen "because it causes most of the mischief" is only to be found on the other side of the Atlantic.

it certainly seems not only permissible but the only practical course to regard all the grass-pollen antigens as one. Pollen from any one of these grasses is therefore polyvalent and is sufficient for treatment of hay-fever.

POLLEN-FEVER IN SUMMER, AUTUMN, AND WINTER

Pollen-fever from the flowers in summer.—Perhaps, to clear up the question of diversity of pollen antigens, I may here deal briefly with sensitisations to pollens other than grass. Of course a number of hay-fever



Urticarial weals given by prick-reactions at the beginning and end of treatment in two cases of hay-fever last year. Note that each case before treatment reacts to all eight grass-pollens employed, and that though they were inoculated with only one of the pollens (*Phleum pratense*) they lost the reactions to all the eight after treatment. A. B., who was first tested on May 24th, with a dose of 40, had only a fortnight's treatment quickened by a "rush"[1] in the middle of it; the second test was on June 8th, when the dose was 20,000. C. D.'s first test was on Feb. 10th, when the dose was 20, and he had four months—chiefly by self-inoculation—before the second test, with 50,000, on June 15th. Both experienced complete relief from hay-fever.

patients, and more in the old days than now perhaps, put down their troubles to some conspicuous or heavily scented flower which happened to bloom during the time of the grass-pollen cloud—"It is only the syringa that affects *me*" or "My hay-fever begins directly the may blossom is out, so it must be that." It is true that there is a difference of sensitisation between the grass-pollens and the pollens of what are popularly called flowers. Some hay-fever subjects will react to hardly any of the flower pollens, while most will react in varying degree to an apparently capricious assortment of them. There are in fact flower-pollen "diseases" running parallel but not identical with true hay-fever, but for a variety of reasons[2] which I will not detail again here, it is unlikely that any conspicuous or heavily scented flower can give much trouble, even to a person who happened to be sensitive to it; and I am doubtful if I have ever come across a case of reputed hay-fever which can really be ascribed to some midsummer flower or flowers.

Pollen-fever from the trees in late winter.—Many of the big trees pollinate at the end of the winter. In America, to judge by the literature, there is a definite so-called hay-fever season at that time of year from this cause. Here in England I think I have come across two or three cases with symptoms derived from tree pollination in February, but the symptoms have never been severe enough to make it worth tackling immunologically.

Pollen-fever from compositæ in autumn.—In the autumn, in the "fall" as they say, they have in both Canada and U.S.A. a so-called hay-fever due to the pollen of lowly organised compositæ, and by common consent in America this fever in September and October is much worse than their midsummer trouble due to grass-pollen—i.e., is worse than true hay-fever.

The actual antigen of this autumn disease varies apparently in different places, but opinions in America have hardened in the direction of *Ambrosia trifida*, popularly called ragweed, which is a wind-fertilised composite. Fortunately this genus is not to be found on this side of the Atlantic (usually not even in the botanical gardens because it is an ugly plant). Let us hope no foolish person introduces it into our countryside for fun. I have come across a number of cases (a couple of dozen maybe) that get an autumn fever due to the pollen of compositæ; certainly in some cases, and so far as I know almost invariably, this is derived from the Michaelmas daisies which flower at the end of September and beginning of October. I have made an extract from this pollen and find it works well in such cases; but usually it is easier for patients to avoid the Michaelmas daisies.

CONCLUSION

Taking it all round, in England the true hay-fever due to grass-pollen is a hundred times more important than all the other pollen fevers rolled into one.

Extracts from all the various grass-pollens furnish one and the same antigen for purposes of desensitisation to hay-fever.

The question of dosage will be discussed in a second part of this article.

[1] THE LANCET, 1930, i., 744.

SOME ASPECTS OF THE PATHOLOGY OF PYÆMIC CONDITIONS

BASED ON A STUDY OF FOUR CASES OF SEVERE ACUTE OSTEOMYELITIS TREATED WITH BENZOL

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PYÆMIA is common in severe cases of acute osteomyelitis. The prognosis depends mainly on the site and accessibility of the secondary abscesses; in other words, provided the patient survives the first few days, the outlook is related to the condition of pus-formation rather than to the actual toxic virulence of the infective agent. It seems reasonable, therefore, to suggest that, if we could check the formation of pus, at any rate in difficult and dangerous

[2] Proc. Roy. Soc. Med., 1920, xiii., 8.

places, we might hope to lower considerably the mortality in pyogenic infections. The treatment of the following cases was founded on this conception. I do not intend here to advocate the use of this treatment, but to discuss points in the pathology of the condition on which the cases throw some light.

No special merit can be claimed for four successive recoveries, even in severe cases of this infection; recoveries may follow almost any treatment. The point is that these cases, in addition to the appropriate surgical treatment, were given benzol by mouth. Benzol has the effect of diminishing the blood-cells, especially the leucocytes, and was given with that express purpose.

Following the life-work of Metchnikoff on phagocytosis, and the further work of Sir Almroth Wright and his school on the opsonic and bactericidal factors of the blood, so much has been said and written on the protective value of the leucocytes in infections that it will be difficult to carry conviction in explaining the rationale of a therapy that seeks to limit leucocytosis during a pyogenic infection. A simile may help. The Bishop of Oxford has lately quoted Mr. Charles Dodgson (Lewis Carroll) as asking the following question of his mathematical students: "If three men can build 10 yards of wall in so many days, how long will it take 300,000 men to build it?" The answers in theory and practice are clearly very different, and it must often happen that 300,000 leucocytes are crowded into a spot where only a very small number could possibly be of use. Wright [1] himself points out that from a practical point of view normal blood contains phagocytes "far in excess of any conceivable requirements."

We are considering here the apparently excessive degree of leucocytosis that infection may cause. An example is seen in scarlet fever, which is to-day a much milder disease than formerly, since, as Prof. Okell [2] points out, the streptococcus in scarlet fever is now less pyogenic and invasive, and more toxicogenic. The idea that disease as we recognise it is, in many cases, chiefly the reaction to infection is no new one; it must go back at any rate to the time of Sydenham, and morbid anatomists especially are driven to feel that the patient quite often dies from the violence of his reaction rather than from the virulence of the infection. In some conditions, such as hyperpyrexia for instance, we do not hesitate to limit Nature's activities, and the question raised here is whether in some markedly pyogenic infections we ought not to try to limit the excessive leucocytosis with its attendant localisation and abscess formation.

INFECTING AGENT AND LEUCOCYTIC RESPONSE

For all practical purposes the infecting agent is the staphylococcus, almost always *S. aureus*. This organism may be very virulent and may cause an acute toxæmia, sometimes rapidly fatal, but, as a rule, in its less acute rôle of pyogenic agent, it leads to the formation of local bone abscess and later to embolic abscesses.

On opening the bone in an early case the surgeon may find no pus, but bright red and bleeding marrow, and may doubt whether he has opened at the right spot. The fragment of bone removed in such cases should always be cultured; a fragment of the marrow laid on agar will often grow *S. aureus* abundantly. The infecting agent is present, and from the clinical signs is causing a marked toxic effect, but as yet there is no pus; the organisms are highly virulent and are not exerting a positive chemotactic influence on the leucocytes. If an effective phagocytosis could take place at this stage it would be of the highest value, but unfortunately it is not a function of the leucocyte to take up and digest such highly virulent organisms. At this time the blood picture may show no marked change from the normal.

After surgical intervention the fever usually begins to fall or to intermit, pus comes from the wound, and the blood count rapidly rises, in favourable cases perhaps to about 15–20,000 and, in spite of a positive blood culture in the early stages, the patient may steadily progress towards cure. In other cases, in which the cell count commonly rises higher, the second phase of the disease proceeds with the formation of a series of collections of pus in one site and another. The surgeon now adopts an attitude of tempered optimism, for he rightly feels, in severe cases, that localisation of pus is associated with a better prognosis than is a pure staphylococcal septicæmia. Why is this? A current view is that the leucocytes have now arrived at infected spots in such numbers that the foe may be expected soon to be vanquished. But we have already seen that when the organism is really virulent there is no leucocytic or phagocytic response, and thus, if we choose, we can take as an alternative explanation that the virulence or toxicity of the organism has diminished, or has been relatively diminished by the development of some form of immunity, and for that reason the bacteria now exert a positive chemotaxis, and a leucocytic response with phagocytosis follows. Thus we arrive at the conclusion that the patient is not now likely to be killed by the toxic virulence of the infecting organism, as seemed possible in the early stages. But we know he may yet die from the fortuitous collections of pus, and especially from purulent emboli in which leucocytes and blood-platelets play a large part.

On the basis of this view it will not be unreasonable if we attempt to check this excessive reaction. Two questions now arise: (1) is it possible to control the leucocytic response in spite of the infection? and (2) if we produce a relative leucopenia, will the infection be correspondingly exaggerated?

(1) *Is it possible to control leucocytosis in the active stages of a pyogenic infection?* It is certain that benzol is at the best a slow and clumsy agent for this purpose; in normal rabbits at any rate I have found it extremely difficult to produce a leucopenia with benzol, and it is impossible to say from these few cases how far it did act as a controlling agent. On the other hand, experience of blood counts of numerous untreated cases makes it practically certain that it did act in this way. What is certain is that in three of these cases there was in the later stages a degree of leucopenia with an increasingly watery rather than purulent discharge whilst the infection was still relatively active. In the fourth case a very profound leucopenia had developed by the fifth week in spite of the presence of a new infection with a pyogenic organism in the pleural cavity.

(2) *Is there any evidence that an infection becomes exaggerated in leucopenic conditions?* It is common knowledge that a leucopenia is associated with the most severe and toxic infections and that such infections tend to a fatal result. Agranulocytic angina, the worst cases of pneumonia, and very severe cases of typhoid fever are typical examples. It is a tempting assumption that these cases are severe because of the leucopenia, but experimental evidence shows that a leucopenia is definitely the effect of a heavy dose of bacterial toxin, and phagocytosis of such highly toxic bacteria would probably not be effected even if leucocytes were present in abundance. It is claimed by Camp and Baumgartner [3] that a local pyogenic reaction to infection occurs

unless the leucocytes are diminished below 1000 per c.mm. We seldom see a leucopenia of this degree, even in the severest infections, but we do see such a diminution in some anæmic and leukæmic cases. There must be abundant opportunity for infection during the months that these cases survive, and yet they commonly die of exhaustion rather than of infection. In Case 4, quoted later, the total white cell count fell below 1000 per c.mm. and the leucocytes below 500 per c.mm. at the time when pneumococci were present in a clear pleural fluid, but the infection subsided without the help of a leucocytosis. It is, of course, not to be forgotten that in these cases there had been, a few weeks before, a high leucocytosis and that the products of these cells might still be available in the body. There is some evidence in these data that infections do not progress or disseminate as the direct result of a leucopenia.

THE FATE OF BACTERIA IN THE BODY

It is necessary that substances coming into the body should be made harmonious with the tissues, if they are not to act as irritants or poisons. The mechanism of harmonisation in the body appears to be either by digestion into simpler bodies and then, if necessary, reconstruction into more complex harmonious bodies, or, as in the case of toxins, a direct neutralisation by preformed antitoxins. When bacteria get into the body three fates may commonly befall them if the host survives: (1) they may become walled in by inflammatory and fibrous tissue; (2) they may be lysed; or (3) they may suffer phagocytosis and intracellular digestion, and this may be carried out either by the migrating leucocyte or by fixed phagocytic cells of the reticulo-endothelial system.

Where lysis occurs we must assume that bacterial toxins are set free and, in the non-immune animals, their effects are soon seen. In such conditions, phagocytosis with the digestion of the infecting bacteria would be of the greatest value, but this process requires some degree of humoral immunity. As the tide turns in infection, and immunity begins to develop or virulence to decline, we get both leucocytosis and phagocytosis, and it is at this stage that the cure is apt to become worse than the disease, or indeed to constitute the disease. It is not as though wherever an abscess forms we find the whole or even the bulk of the bacteria ingested and destroyed; on the contrary pus teems with dead leucocytes and living bacteria. Barring mechanical difficulties, such as the presence of bone, it is true that an abscess once drained usually clears up quickly, but we have to consider abscesses in situations that are not or cannot be opened, such as the lung, heart muscle, and hip-joint, and, however much we may value the leucocytes, we are forced to the conclusion that we should be better off without these collections of them.

A neutralisation of the toxins is apt to increase the pyogenic capacities of an infecting organism, that is to say, leucocytosis increases as immunity develops; so that animals with a high antitoxic immunity may yet die of abscesses produced by an infection with the organism to the toxins of which they are quite immune. Panton and Valentine [4] have, however, produced an antitoxic serum which, so far, they think diminishes secondary abscess-formation in staphylococcal pyæmia. Although patients rarely die in the early toxic stage of the disease, it seems that the early stages should be treated with a serum and after that, if possible, we should control the leucocytic response and localisation so as to prevent secondary abscess formation.

ACTION OF BENZOL

This drug is given mainly in cases of myeloid leukæmia with the object of diminishing the number of white cells. In due course it also diminishes the number of blood platelets [5] and of red cells. In the first place it is said usually to lead to a slight rise in the number of both red and white cells, and then to a gradual fall, mainly of the white cells. The fact that the fall in the white cells is slow, and also that it continues after the drug has been withheld, makes benzol a clumsy agent for this purpose. Moreover, if pushed it is likely to damage the liver cells, and this effect also must be taken into account in using the drug in an already toxic case and one which has had and may require again to have anæsthetics.

Since the cases described in this paper recovered we must also consider any other possible action of the drug on the disease in general. Benzol may possibly have a directly injurious action on the staphylococcus in the way that arsenobenzol has been shown to have on anthrax and on some streptococci; also, as a lipoid solvent, it may become attached to the nerve tissues of the body and so act, in the "phylactic" sense of Bichât, in protecting the nerve centres from toxic absorption. We have no proof that it functions in either of these ways.

TREATMENT OF THE CASES

In each of these cases an opening in the bone had been made by the surgeon in charge, and drainage established. We cannot say that this is absolutely essential in all cases, but it does seem to have a useful effect in letting some of the toxic matter escape and perhaps in that way helping the development of immunity in the host, or (what for our purpose anounts to the same thing) diminishing the virulence of the infecting organism. After the operation, as soon as the blood count was found to be actively rising, the cases were put on benzol by mouth, 10 minims twice or thrice daily or for the younger children, 5 minims three times a day, according to the degree of the white cell count and also the amount of red blood available, for this may in time also be affected. The drug is given in capsules or in milk. The progress of the white cell count was followed every few days and when the count had fallen, say to about 10,000, the drug was discontinued. It has to be remembered that the fall may continue after the drug has been stopped so that where the administration had been continued for some time it was stopped while the count, though falling, was still relatively high, say 12,000 to 15,000.

Cases.—Protocols and charts of three of these cases were shown before the Pathological Section of the Royal Society of Medicine in March, 1930, and will only be abstracted here.

CASE 1.—A boy aged 7. Osteomyelitis of lower end of tibia. White cell count: 45,000, five days after operation, benzol ♏ 5, t.d.s. by mouth in capsules. In 14 days the count had fallen to 5000; the benzol was stopped, and the patient steadily progressed to convalescence.

CASE 2.—A boy aged 11. Infection of the lower end of the femur. Count at the time of operation: 25,000; put on benzol ♏ 5, t.d.s. Count rose to 65,000 during the next seven days, benzol increased to ♏ 10, t.d.s. Count fell to 20,000 during the next week, but rose again to 35,000 and remained thereabouts for a further two weeks, when two large subcutaneous and intramuscular abscesses were drained. It fell in the succeeding three weeks to 8000, during which time no further abscesses formed; the benzol was then discontinued. In the next 14 days the count rose again to 30,000, and during this period four additional abscesses formed and were drained. No further benzol was given and the count gradually fell in the next two and a half weeks to 15,000, and the patient became convalescent.

CASE 3.—A boy of 12 years. Infection of the lower end of the femur. Count at time of first operation: 15,000. Case put on benzol ♏ 10, t.d.s., at once. Count rose in the next five days to 23,000, fell again to 10,000 in a further five days, and then to 5000 in a further 15 days. Taken off benzol. The count continued gradually to fall during the next 30 days to 4000. During this time, as the temperature remained irregular and the count under 5000, the bone was guttered, without ill-effects. The count gradually rose to about 10,000 during the next three weeks and the patient became convalescent. During the two and a half years since leaving hospital three residual subcutaneous abscesses have formed and been opened. His general health has been excellent.

CASE 4.—A boy of 5 years. Infection of upper end of tibia. Early operation, no pus, *S. aureus* grown from bone-marrow. White cell count at operation: 12,500; rose to 35,000 on third day. Benzol ♏ 5, t.d.s. for ten days, when the count had fallen again to 12,500. Twelve days later the count had fallen to 5000, and in a further three weeks to 1000, with 50 per cent. polymorphonuclear leucocytes. It gradually rose in the next ten weeks to 8500. Very little in the way of secondary abscesses formed, but at the time the count was down to 1000. A large effusion in the chest was drawn off. The fluid was clear and contained practically no cells, but large numbers of pneumococci were present. Fluid was also present in the pericardium and peritoneum.

A fifth patient died 24 hours after treatment with benzol was started, and is not included in the series.

EFFECTS OF TREATMENT

Treatment of these cases with benzol was adopted with the object of preventing metastatic abscesses; can it be said to have been effective? If a purulent reaction to infection occurs, as Camp and Baumgartner [3] claim, unless the white count is reduced below 1000 cells per c.mm. it is clear that only in the later stages of the last case could we have hoped to achieve that end and completely abolish suppuration. It is not even certain that the degree of abscess-formation will be proportionate to the number of leucocytes in the circulation, since extensive cold abscesses may occur with quite low cell counts, though of course they are a long while accumulating. It is, however, likely that the number of abscesses formed will be fewer and their development less progressive as the white cell count falls. We can put on one side for the present the question of leukæmic states of the blood for, while it is true that there seems no tendency to excessive purulent reaction to infection in myeloid leukæmias, even when an enormous excess of adult polymorphonuclear leucocytes is present, it is equally true that in lymphatic leukæmias, when polymorphonuclear leucocytes may be practically absent, there seems no marked tendency for bacterial infections to take hold and spread unchallenged.

Exactly what would or would not have happened in these cases if benzol had not been given it is impossible to say, but in three of them a definite note was made that the discharge from the wounds quickly became less purulent as the count fell and in the last case of the series pneumococci were present in a serous pleural fluid which was practically clear of cells.

SUMMARY

Four cases of acute osteomyelitis with septico-pyæmia were treated with benzol with the object of diminishing the leucocytic reaction. In three of them there was a marked fall in the white cell count, and in the fourth a profound leucopenia set in. The purulent discharge diminished and became more watery. The patients all recovered and no after-effects of the benzol have been noted. (The most recent of the cases quoted was two years ago.) It is claimed that in these cases there was an artificial restriction of the output of leucocytes in the later stages of the disease and that this was an advantage rather than the contrary. Though a consideration of the part played by leucocytes and their products in immunity is omitted, it will be seen that a leucocytosis and localisation of pus is represented here as an index rather than as a necessary adjunct of immunity.

The object of the paper is not to advocate benzol as a method of curing pyæmia but to consider whether in this condition we ought not to seek for a direct method of preventing the over-production of leucocytes and their localisation into abscesses.

My thanks are due to my surgical colleagues for their consideration of the point of view set forth in this paper, and their courage in adopting an apparently reactionary treatment.

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MAGNESIUM SULPHATE IN THE TREATMENT OF ANGIOSPASM

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SPASTIC conditions of the arterial wall, in the light of our inadequate knowledge of vascular disease in the living human body, may be roughly divided into two groups. The first includes hypertonus of the arterial wall of the large and medium-sized vessels, usually but not necessarily associated with arterial hypertension.[1 2] It is probably toxic in origin, and its classical example is the vascular picture in chronic interstitial nephritis. Our only method—a very imperfect one—of diagnosing hypertonus is by palpation of the vessels. The second group consists of angiospasm. It may affect any part of the arterial tree right down to the capillaries. The veins are not affected because of the weakness of their muscular wall, although there is abundant evidence that they too are submitted to the influence of the vasomotor system.

Hypertonus of long standing is injurious in itself, but it also leads either to atheromatous degeneration of the intima or to vascular spasm. The only defensive reaction of the artery to a stimulus being its contraction, it is easy to appreciate that spasm of the vessels may be brought on by many factors. The most essential are:—

(1) General or localised toxæmia acting directly on the arterial wall.
(2) Hypertonus.
(3) Atheromatous degeneration of the intima.
(4) The influence of the vasomotors.

Vascular spasm may be diagnosed by inspection; by palpation; and, if practicable, by oscillometry and by the ophthalmoscope in the extremely rare cases where the retinal vessels are involved. The duration of vascular spasm may be a few minutes or a few hours, but the mischief done may be immense if a portion of a vital organ is affected and is unable to recuperate quickly. Therefore medication must also be rapid and, of course, harmless.

Whilst searching for such a drug I remembered the efforts made to cure tetanus by subcutaneous or intrathecal injections of magnesium sulphate,[3-5] and decided to try it in cases of vascular spasm. It took a considerable time to find the most suitable

dose and the best way of introducing it into the body. The results in many cases were so gratifying that I venture to publish them with a plea for its further trial by the profession.

INTERMITTENT CLAUDICATION

CASE 1.—A male Jew, 49 years old, a heavy smoker, complained of cramps in the legs when walking, and frequent attacks of severe pain in the big toe at night. His brachial blood pressure was 160/90; the oscillometric index of the brachial artery was 4, of the right calf ½, and of the left 1. After the first injection the index was 2 in the right leg and 3 in the left, and the patient felt much better. Later, immediately before the intravenous injection of magnesium sulphate, the brachial blood pressure was 150/90, the brachial oscillometric index 4, that of the right leg 3, and that of the left leg 8. Immediately after the injection the blood pressure was 150/90, and the brachial oscillation 4½, that of both legs being 8. After the third injection the patient felt fit and walked without any difficulty, and attacks of pain at night disappeared. Before the injection the index for the right leg was 6 and for the left leg 8; after the injection both legs were 8. Now he comes once a month for examination; the oscillometric index in both legs is 6. This is an early case, where the anatomical changes have probably not yet taken place in the most distal vessels and the spastic element is predominant. The result in the following case was less dramatic.

CASE 2.—A male Jew, aged 49 years, a smoker, could not walk upstairs or uphill; his walking distance was approximately 100 yards. The oscillometric index in the right leg was ¼ or ½, in the left leg 3. After three injections the indices were ½ and 4; he walked and felt better. At the completion of the treatment the indices were 1 and 4. He visited a spa and underwent a treatment of hot mud-baths. Three months later the indices were unaltered. There was no limit in his walking distance, but if he had to climb up to the third floor he had to do it slowly and stop once or twice for a rest.

Some benefit from the injection of magnesium sulphate was observed in all cases of endarteritis obliterans or Buerger's disease. Success depends upon the part played in the clinical picture by the arterial spasm which is invariably present.

CASE 3.—A spinster, 24 years old, had disseminated sclerosis. When she attended my surgery I noticed dead fingers in both hands with the exception of the thumbs. The normal colour returned within a few minutes of an intravenous injection of magnesium sulphate.

MIGRAINE

CASE 4.—A married woman, 32 years old, had nocturnal attacks of severe headache with vomiting and palpitation. I had the opportunity of witnessing an actual attack and I realised that I was dealing with a case of real migraine. A dozen injections of magnesium sulphate cut short the attacks and she has now been free from them for a year.

SPASM OF THE BRACHIAL ARTERY

CASE 5.—A man, 64 years old, complained of giddiness. I could not feel his pulse in the radial, brachial, or temporal arteries; by auscultation of the heart, the pulse-rate was found to be 150 per minute. The oscillometric index of the brachial artery was ½. The arteries of the fundi were not narrowed. The day after a magnesium sulphate injection intramuscularly he felt better; his blood pressure was 100/50 and his pulse-rate 60. Two days later, seen at my surgery, the oscillometric index of the brachial artery was 2½.

ACUTE PULMONARY ŒDEMA

Several cases of this distressing condition have left me with the impression that cardiac failure was secondary to the onset of the attack. When seen very early, where the blood pressure was previously known, I found it at the usual level, but falling quickly with the progress of the attack. A paper on this subject has been published by M. Cohen.[6] Fischer [7] may be correct in attributing some cases of acute pulmonary œdema to spasm of the bronchial arteries.

CASE 6.—A married woman, aged 45, with six children, had a blood pressure of 200/220 systolic and 100/120 diastolic, and well-marked sclerosis of retinal vessels. Once in three to six months she suffered an attack of acute pulmonary œdema. She became pregnant, and from the third month of gestation the attacks increased in frequency, the blood pressure remaining at the same level. After one or two very severe attacks the patient, having learned by bitter experience the uselessness of waiting in the hope that the attack would pass off, came to see me immediately she felt a tightness of the chest. I invariably found the pulse-rate quickened, the blood pressure at its usual level, and the respiration frequent and shallow with ominous râles all over the chest. Intramuscular injection of magnesium sulphate always checked the attacks, the patient recovering in six or twelve hours.

ANGINA PECTORIS AND CORONARY THROMBOSIS

Only in some of these cases did magnesium sulphate bring relief.

CASE 7.—A married woman, 62 years old, had had essential hyperpiesis for the last few years, her blood pressure being 180/200 systolic and 100/110 diastolic, with marked sclerosis of the retinal vessels. Occasionally her blood pressure dropped to 135/80 without any sign of cardiac failure. One Thursday she experienced retrosternal discomfort and general weakness, and went to bed. On Friday she felt better and walked about. On Saturday at 10 P.M. I was called to see her; she had agonising retrosternal pain, a pulse-rate of 84, and a blood pressure of 190/110. She became easier immediately after an intravenous injection of magnesium sulphate. On Sunday she was quite well. On Monday at 4 A.M. I saw her again; she had similar pain, this time radiating down the left arm; vomiting; and the same pulse and blood pressure. She was slightly better for a while after an intravenous injection of magnesium sulphate, but the pain returned very soon. At 7.30 A.M. she presented a typical picture of coronary thrombosis; gr. ½ of morphine was injected and she fell asleep soon afterwards.

CEREBRAL ANGIOSPASM

The diagnosis of vascular spasm in the terra incognita of the cerebral circulation is hazardous and difficult. The phenomenon is almost a new idea in medicine, and has lately been ably dealt with by Gubb [8] and Allen.[9] Angiospasm of the retinal vessels was recently discussed by Mylius (with excellent photographs) and by the author. Baillart's "La Circulation Retinienne" gives a very remarkable description of the living fundus.

I have not seen any harm result in cases of cerebral "vascular accidents" from the injection of magnesium sulphate; sometimes a striking improvement seems to follow. The ophthalmoscope does not help much in such cases.

CASE 8.—A married woman, 61 years old, had been suffering for years from essential hyperpiesis, 200/210 systolic and 110/120 diastolic, well-marked retinal sclerosis, and occasional attacks of bronchial asthma. One morning she woke and found herself unable to speak or to move her right arm and leg, the face not being involved. A neurologist who saw her in consultation diagnosed cerebral thrombosis. I saw her the following day and diagnosed influenza with broncho-pneumonia; the movements of the limbs were restored but the speech remained difficult. In my opinion the cerebral symptoms were probably due to a vascular spasm. Three weeks later speech was still improving and movement of the limbs was quite free, but cerebration at times was confused and rather childish.

CASE 9.—A childless widow, 55 years old, awoke one morning with a mist before her right eye. The pupil of this eye was enlarged nearly ad maximum, but still reacted sluggishly to light; all ocular movements were normal; the retinal vessels were slightly sclerotic, but a few arteries showed changes in their lumen. The blood pressure was 200/100. Magnesium sulphate was injected; she was ordered to bed and given a mixture of bromide, mercury, and iodide, and placed on a fruit diet. On the third day she returned with a blood pressure of 150/95 and the eye quite normal. The urine was normal and the Wassermann test repeatedly negative.

TECHNIQUE OF INJECTION AND PROBABLE MODE OF ACTION

The patient lies on a couch with the head and shoulders slightly raised, and a solution of magnesium sulphate and glucose is slowly injected into the vein. The dose is 5–10 c.cm. of a 20 per cent. solution and an equal volume of 10–40 per cent. glucose.

About half a minute after the commencement of the injection the patient feels an intense heat in the body. This is first experienced at the back of the pharynx, then in the face and neck, then in the thorax, and sometimes in the upper limbs, and it proceeds down to the rectum and genitalia, the lower limbs being the last to react. The face is sometimes intensely flushed and may even perspire; the skin of the limbs and body hardly alters in colour or temperature. The pulse becomes moderately quickened. The blood pressure is unaltered. On ophthalmoscopic examination the retinal vessels show no change.

In my opinion the magnesium sulphate probably relaxes vascular spasm by direct action on the vasomotor centre of the brain (either cerebral only or spinal as well). If it acted directly on the arterial wall, there would not be the constancy in the order of the sensation of heat. The more spastic or more clogged the vessel, the less is the sensation of heat and the less effective is the injection. The patient can tell exactly where the sensation of heat ceases, and I have found that the oscillometric index invariably corresponds to the patient's sensations. For example, if the patient does not feel the heat in his calf, the oscillometer will not show any increase in the index. I was, therefore, always pleased if the patient felt the warmth throughout the whole body.

If the intravenous mode of injection is for some reason impracticable the solution of magnesium sulphate without the glucose is well tolerated intramuscularly, but the intravenous route is the one recommended.

It is rather strange that the retinal vessels remain completely unaffected in spite of the general vasodilatation and the fact that the face is the most responsive part of the body. This retinal inaction corresponds to the findings of Baillart,[10] H. Claude,[11] and others, who have observed that the retinal vessels are unaffected by ordinary vasomotor drugs. In my opinion this is further evidence that the retinal vessels may be almost independent of the general vasomotor centres.

I did not observe any discomfort in any of my patients, although several of them were well over 60 years of age, and I think that the alarming signs of respiratory distress that have been seen in the cases of tetanus treated with magnesium sulphate may be explained as due either to the intrathecal method of injection or to excessive dosage. I usually administer the treatment to my patients twice a week.

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London.

FORTUNE FOR MELKSHAM COTTAGE HOSPITAL.—The late Mrs. Ludlow Bruges, formerly of Seend and Bath, who died in Jersey in July last, left the residue of her estate to Melksham Cottage Hospital on condition that a new wing should be built at a cost not exceeding £10,000. It is presumed that Mrs. Bruges intended the remainder of the estate to be used as an endowment fund. It is believed that the hospital will benefit to the extent of about £100,000.

Clinical and Laboratory Notes

CEREBRO-SPINAL FEVER

TREATED WITH LARGE DOSES OF MENINGOCOCCIC SERUM

BY J. TODESCO, M.D. FLORENCE, M.R.C.S. ENG.
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A BOY, aged 7, was admitted to the Borough Hospital on March 11th, 1932, as a case of cerebro-spinal fever. There was a history of sudden headache, vomiting, and fever on March 8th, with subsequent marked head retraction and rigidity of neck and spine. Four days previously he had been struck on the head by a stone. In 1930 he had had scarlet fever and measles.

On admission the boy was semiconscious, very cyanosed, with extreme head retraction, opisthotonos, and marked general hyperæsthesia and rigidity. The pupils were large, equal and fixed, photophobia being present. The knee-jerks were absent, and the plantar reflex flexor; bilateral Kernig's sign and tâche cérébrale were present. He was very irritable, feverish, wandering and restless at times, and resented examination. Lumbar puncture soon after admission yielded 60 c.cm. of turbid, blood-stained fluid under pressure, the fluid containing excess of polymorphs and meningococci, which were recovered on culture. He was given 20 c.cm. of meningococcic serum intraspinally. On the evening of March 13th he had severe epistaxis.

Between March 15th and 24th he was worse, being very drowsy, with marked general rigidity and head retraction, and very poor colour and pulse. There was marked general body wasting; he was reduced to "skin and bone" and had extreme general weakness. Subsequently he developed large abscesses over the right knee-joint, left side of face and neck, and left iliac crest. The abscess of the jaw was drained on April 16th and contained thick pus and large sloughs. All the abscesses were healed by April 25th.

A week later the boy began to improve; the head retraction was almost gone and the general rigidity less marked. He now appeared to understand when spoken to, but his speech was slow and hesitating. Right internal strabismus was noted. He was convalescent by May 12th and, though the right internal strabismus persisted, his mental condition was normal. He made an uninterrupted recovery.

From the time of admission until April 7th the patient was treated constantly by lumbar puncture and injections of meningococcic serum, both intrathecally and intramuscularly, as will be seen from the accompanying Table, the doses varying between 10 c.cm. and 25 c.cm. daily. He was given 320 c.cm. in all. The temperature kept between 99° and 103° F.

Date.	Cerebro-spinal fluid withdrawn.	Serum given		Date.	Cerebro-spinal fluid withdrawn.	Serum given	
		Intra-thecally.	Intra-muscularly.			Intra-thecally.	Intra-muscularly.
March.	c.cm.	c.cm.	c.cm.	March.	c.cm.	c.cm.	c.cm.
11	60	20	—	25	81	15	10
12	17	10	—	28	—	—	10
13	12	12	—	29	60	15	—
15	8	—	—	30 & 31	—	—	10
16	? a few	10	10	April.			
17	56	10	5	1	5	4	10
18	—	—	15	2 & 3	—	—	10
19	70	15	10	4	4	4	10
20	60	10	10	5–7	—	—	10
21	10	10	—				
22	45	10	5				
23	—	—	10	Total	488	145	175

for over four weeks, showing marked daily variations; it then became subnormal and remained so.

The points of interest in this case are: (1) The recovery of the patient after a severe and progressive attack of cerebro-spinal fever, with strabismus as the only permanent disability. (2) The treatment by repeated lumbar puncture and administration of meningococcic serum over a long period, 14 lumbar punctures and a total of 320 c.cm. of serum being given. This may have influenced favourably the subsequent course of the disease. (3) The development of multiple abscesses and synovitis of the right knee-joint which, according to Netter,[1] is a favourable sign as regards recovery in cerebro-spinal fever. (4) The appearance of severe epistaxis during the first week, with temporary improvement, this not being a usual complication of cerebro-spinal fever.

I wish to thank Dr. Oscar Holden, medical officer of health for Croydon, for permission to publish this case.

RECOVERY FROM THE EFFECTS OF SYMPATHETIC DENERVATION

By Lambert Rogers, M.Sc. Wales, F.R.C.S. Edin., F.A.C.S., F.R.A.C.S.

ASSISTANT DIRECTOR OF THE SURGICAL UNIT OF THE WELSH NATIONAL SCHOOL OF MEDICINE, ROYAL INFIRMARY, CARDIFF

THE fact that recovery gradually takes place from the ocular changes produced by cervical sympathectomy is not generally known, though the late Sir Percy Sargent was aware of it.[1] It has been observed, however, that the pupil of the rabbit subjected to cervical sympathectomy gradually recovers its size, and recently I have had an opportunity of observing a similar recovery in man. Four years after a cervical sympathectomy, recovery from its effects was almost complete, despite the fact that at the operation half an inch of the cervical sympathetic trunk with its middle ganglion had been removed.

In January, 1928, a railway guard, aged 25, was transferred to the surgical unit of the Welsh National School of Medicine with acute exophthalmic goitre. The goitre was very small, diffuse, and highly vascular. He was treated by stage ligation of the thyroid arteries, and his general condition, including that of his cardiovascular system, improved considerably. Exophthalmos, however, persisted and was so pronounced on the left side, that it appeared as if this eye might become dislocated or meet with some injury. Accordingly, on Dec. 3rd, 1928, cervical sympathectomy was carried out on the left side, the middle ganglion and half an inch of the sympathetic connecting trunks above the ganglion being removed through an incision along the anterior border of the sternomastoid. As a result of the operation, the left palpebral fissure immediately diminished in width, and the pupil of the same side contracted to a pin-point and remained so contracted when the other pupil dilated in weaker light. He made a gratifying recovery and returned to work. It was not considered necessary to perform a similar operation on the other side. Although the right eye was somewhat protruded this did not inconvenience him.

At the present time, over four years since the denervation, both palpebral fissures are the same width; the left pupil in strong light contracts more than the right but dilates well in shade, and when the right pupil is at its maximum width the left is only very slightly smaller. A very considerable degree of recovery has therefore occurred.

The mechanism of the compensation which takes place when such recovery occurs is being investigated. The fact that recovery from the ocular changes comes about, brings this feature of sympathetic activity into line with the vascular responses to sympathectomy which, as is well known, are soon recovered from. The rapidity of adjustment following the changes induced by peri-arterial denervations has previously formed the subject of communications by Hemingway and myself [2 3] and others.

[1] Quoted by Rolleston, H. D.: THE LANCET, 1919, i., 600.

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A CASE OF GENERALISED VACCINIA

By C. J. de Vere Shortt, M.B. Dub., D.P.H.

LATE MEDICAL OFFICER OF HEALTH AND PORT HEALTH OFFICER, ABADAN, SOUTH PERSIA

ALTHOUGH after vaccination secondary pustules are sometimes seen round a primary mark, generalised vaccinia is comparatively rare.

On Dec. 1st, 1932, I vaccinated a well-nourished healthy baby weighing 15 lb., aged 3 months, using Government Establishment lymph, and making one scar on the left arm. At the same time I vaccinated an elder child, aged 10 years, in the same house, using the same lymph. On Dec. 7th I inspected both arms, and found them both clean and healthy, presenting the features of a normal six-day vaccination. On Dec. 20th I was asked by the medical officer of health if I would call and see the younger child as some spots had broken out over the body. When I arrived I learned that about three days previously the spots began to appear. The outer surface of the left arm was bright red, the redness extending from 1 in. below the shoulder to about 1½ in. above the elbow. This arm was covered by necrosed skin, and presented the appearance of a large blister out of which the fluid had been withdrawn. There was a slight temperature (99° F.). The child was restless, fretful, irritable, and refused food. On the wrists, thighs, legs, and head, there were raised pearly spots in varying stages of development, and of various sizes, some of which were umbilicate and some appeared more like alastrim spots than those of small-pox.

On Dec. 21st the child was admitted to Fazakerley Hospital under the care of Dr. C. Rundle. On admission there were numerous small vesicles around the original larger one on the left arm, and the spots on the body had developed into typical vaccination pustules. The distribution was then face, back of scalp, both wrists, left thumb, right buttock, and several on the right leg and thigh, and soles of both feet. The temperature was 99°; pulse 132; respiration 34. On Dec. 23rd the temperature went up to 100·4°. The pulse-rate was 144, and the lesions were spreading with copious eruption on both legs and buttocks, and on the face some of these were the size of a shilling. The temperature then fell to normal and remained so till Dec. 26th. On the 25th fresh pustules developed on the back and front of both thighs, but with no rise of temperature. On Dec. 26th the temperature again rose to 99·6°, and the arm became very baggy and was inclined to slough. There were numerous water vesicles at the outer edge. The child was taking food well. On the 27th the temperature rose still further to 100·4°, with pulse-rate 178, and the child developed convulsions and died.

The *post-mortem findings* were as follows:—

The body was that of a well-nourished child. Over the outer surface of the left upper arm was a bare bright red inflamed area 4 in. long by 3½ in. in diameter, and extending approximately from the shoulder to the elbow. There was some deeper coloration of the central portion, suggesting that this was the oldest portion of the lesion and that it had commenced there. The body was covered with raised pearly spots varying in size from about ¼ in. in diameter up to ½ in. The larger of these were depressed in the centre and had thickened edges resembling blebs and giving the appearance

of developing vaccination pocks. The largest and oldest lesions showed necrosis in the centres and the formation of crusts. There was little or no pustulation. The distribution of the lesions was general but they were more numerous on the lower limbs than on the trunk and upper part of the body. The thoracic organs were healthy, except for some terminal congestion and œdema of the lung bases. The liver and spleen both showed areas of necrosis having the characters of vaccinia lesions. The other abdominal organs showed no abnormality.

Microscopical examination of the skin lesions showed these to have the character of vaccinia papules. The same characters were found in the focal lesions of the spleen and liver. No changes of importance were found by microscopical examination in the brain and spinal cord or in the other organs (suprarenal, heart, kidneys, pancreas) which were examined in this way.

It is obvious from the pathological report that this has been a blood-borne infection. Dr. J. H. Dible, professor of pathology in the University of Liverpool, has stated that he has never seen a case of this kind. It can hardly arise from any septic infection, for the parents and home were extremely clean and there is no evidence of such infection being present. While I was in Persia several thousand vaccinations were done either by me or under my supervision. The scar was made and the lymph was allowed to dry on. It was impossible to keep either pads or bandages on the natives' arms, so after drying they were left uncovered. No untoward result was ever seen. I have had several letters on the subject, and in one the writer has reported to me a case of general vaccinia which occurred in a baby that had been washed in water with which an elder child, who had been vaccinated, was bathed.

I am indebted to Prof. Dible for the report on his post-mortem and bacteriological findings, and to Dr. C. Rundle, the medical superintendent of Fazakerley Fever Hospital, for his notes on the case whilst it was under his care.

MEDICAL SOCIETIES

FELLOWSHIP OF MEDICINE

ON March 9th Lord MOYNIHAN took the chair at a meeting of the Fellowship of Medicine and Post-Graduate Medical Association which was held in the rooms of the Medical Society of London and was occupied by a debate on

Operation for Appendicitis

Mr. R. M. VICK said it was a tragic thing that in the year 1933, so long after Treves, so many doctors were willing to discuss whether or not the appendix should be removed when inflamed. He hoped that the revived expectant treatment would be stamped out and its ghost laid. He spoke only of those cases in which the diagnosis had been made as certainly as was humanly possible and where the condition had not subsided by the time the surgeon arrived. In all such cases operation should be performed at once. This battle had been fought out long ago, and the need for operation established. Hundreds of people to-day owed their lives to that recognition. Yet the devil of doubt had arisen again—partly because of the universal fear of operation, partly because not all operations were done by surgeons of experience, and partly through the eternal desire for change. A rising mortality in appendicitis was coming, owing to this pernicious revival of expectant treatment. Sooner than proffering statistics he would say: "Behold, I have passed through the valley of the shadow and I have seen terrible things." Why should we postpone an operation which was always successful, easy to perform, and which transferred the patient from a state of danger to a state of safety: the operation within 48 hours of onset? He would, indeed, go further and advise operation on every inflamed appendix. What applied to adults applied a hundred-fold more to children. There would be no great danger and a certain amount of sense in waiting, if it were possible to know what was happening to the appendix, but it was not possible. He proposed "That in every case of acute appendicitis immediate operation was indicated."

Mr. V. ZACHARY COPE opposed the motion, particularly the words "immediate" and "in every case." There were cases in which immediate operation would be disastrous. He agreed with operative measures in unperforated cases, in cases of doubt about perforation, in cases of well-formed abscess, and in most children, but he did not operate in advanced peritonitis; or in cases with a well-formed lump not apparently getting worse; or on patients whose general condition was very bad, and in whom preliminary recuperative treatment, such as saline infusion, might make the operation safe after 12 hours. Many patients had had no treatment before they saw the surgeon and needed preparation for operation. Every case must be judged on its merits, or what was the use of surgical skill and experience? Expectant treatment had not been tried in past years because most of the measures concerned had been unknown in those days. Was the rule of thumb to displace experience? A skilled clinician could tell how the pathological process was going in most cases. In doubt, operation should be performed. There would be no danger of calamity if the patient were put immediately under the care of a skilled surgeon.

Mr. W. H. OGILVIE said that appendicitis was an everyday problem and must be approached with an open mind. He felt almost inclined to agree with Mr. Cope. There were cases of appendicitis in which immediate operation was unwise, but he doubted if these cases were "acute." They were subsiding by the time the surgeon saw them, and were not manifestly ill. Nor was operation desirable in bad surroundings. Nevertheless he only felt justified in withholding operation in 1 or 2 per cent. His experience had impressed him with the fallibility of human judgment. With exactly the same history and physical signs, the appendix might be found distended with pus and about to burst, gangrenous and not distended, or apparently healthy with a little inflammation inside only. Nor could he forecast what was going to happen, and he had much fear for the watched case. The demand for revision of treatment was based on the Registrar-General's figures, which showed that the total mortality had not decreased. These figures, however, did not indicate the great increase in the number of operations and the improvement in diagnosis. He believed the mortality to be no more than a third of what it had been. In Denmark the mortality had been shown to increase steadily with every day that elapsed between onset and operation. The real bone of contention was the third- to fifth-day case with rising temperature and pulse-rate. Mr. Ogilvie confessed that he lacked the courage to wait. At the beginning the risks could be foretold, but as time passed the gamble became greater. He had always operated and had lost only

one case: from pulmonary embolism on the tenth day. He put in a plea against being too clever in surgery. The general and the particular aspects of a case were apt to be in conflict. Brilliant surgeons and prognosticians had led humbler men into paths of danger. Appendicitis was the job of the journeyman surgeon, and for him operation was the right course and the safe course.

Mr. R. J. McNEILL LOVE divided cases of appendicitis into four groups. Everyone agreed that the early cases demanded operation and the subsiding ones to be left alone. The third group was that complicated by general peritonitis. The fourth was the one needing careful consideration: the patient was seen about 48 hours after onset and showed some elevation of temperature and pulse-rate, localised rigidity, and tenderness per rectum. These cases were what older practitioners had termed perityphlitis. Operation was difficult, drainage was usually necessary, and localised peritonitis became potential generalised peritonitis. On the fifth day the patient was in a negative phase of resistance, and the operative mortality was about 5 per cent. Complications, also, were encouraged by untimely operation. Expectant treatment must rigorously enforce the four F's—Fowler's position, fluids only, fomentations, and a four-hourly chart. Water only must be given by the mouth, and this did not mean beef-tea and custard. Children should not be treated expectantly, for they had usually had purgatives. If the case were watched the inflammation might subside in 50–70 per cent. of cases, and a clean operation without complications could be performed later. An abscess might form in 25 per cent., but this was no occasion for panic; it showed that the resistance could arrest spread of infection. Usually the abscess would resolve, but should be opened if it increased in size or was absorbed too slowly. Gas-and-oxygen and a small incision were adequate. Thirdly, in 10 per cent. of cases, the patient might require emergency operation, but even here the mortality was only about 6 per cent. The average mortality after expectant treatment was no more than 3 per cent. The patient must be under surgical observation the whole time. Localisation would probably occur if the appendix were retrocæcal or paracolic, and infection would spread from an appendix pointing inwards or upwards. Psychology played an important part in the public estimate; for if the watched patient succumbed everybody felt he might have survived if operation had been performed at once; but if he died after immediate operation he was soon buried and forgotten.

Mr. W. TURNER WARWICK said he would operate a little earlier without the help of an experienced surgeon than he would if this were available. The retrocæcal type of appendix might or might not develop an abscess; these could be operated on at any time. The pelvic type should always be operated on at once. Those that spread to the left fossa should be opened up or there would be several separate collections of pus. The retro-mesenteric appendix was very dangerous, producing thrombosis or a small abscess with obstruction of the ileum; but when treated early these gave a good prognosis. When the appendix ran behind the peritoneum on the posterior wall a spreading cellulitis might result, and be almost impossible to treat if suppuration were allowed to supervene. His advice, therefore, was to distrust philosophy and operate on the acute appendix.

Mr. A. TUDOR EDWARDS agreed that a waiting policy was advisable in two kinds of case—the subsiding case, and the abscess in a patient whose temperature and pulse were settling down. Otherwise he was in favour of immediate operation.

Mr. HAMILTON BAILEY advocated the method of Sherren. In acute cases with a localised palpable mass, the mass usually disappeared; if the abscess burst, prompt treatment would save life. Two and preferably three months should elapse between resolution and appendicectomy. The rule of letting out pus whenever it was present could frequently be broken and, if so, the day of surgical judgment could not be said to be past.

Mr. W. B. GABRIEL was in favour of immediate operation, and believed that the mortality was extremely small. The expectant treatment of abscess had found favour because some abscesses had been injudiciously and crudely operated on.

Mr. H. J. PATERSON said that appendicitis, if treated intelligently, was not nearly such a serious disease as was supposed. He opposed the motion. A perforated appendix was not necessarily fatal. Nature was a far better surgeon than even the youngest of us. In 1911 he had opened a debate at the British Medical Association on the side of operation, but since then he had learned wisdom. Thorough preparation was absolutely essential for any operation, and particularly in acute cases. Very often the preparatory treatment produced such improvement that operation was unnecessary. In the last two and a half years he had had 59 delayed cases with no deaths, and 26 immediate operations with 2 deaths. He could see no objection to drainage; better a weak spot in the abdomen than a coffin, however well padded. That sepsis required drainage was one of the eternal verities of surgery. Was operation always desirable from the patient's point of view? Immediate operation was not necessary in most cases of acute appendicitis, and cases of general peritonitis were better left alone. Surgery was still an art, and there was still room for common sense and clinical judgment.

Dr. A. CAMPBELL pleaded for the young graduate who had been urged to let out pus whenever it was present. The expectant treatment demanded a degree of skill that could not be demanded of a young man. It was safer for the young man to operate, provided he worked with skill, and when he had had experience he could select cases for watching.

Mr. SINCLAIR thought that the expectant treatment sometimes left patients with unresolved lumps. He operated in all cases, except that he did not remove the appendix from a localised abscess, especially in children, in whom the risk was very great.

Mr. C. E. SHATTOCK was in favour of operation, and emphasised the importance of the technique.

Dr. BATEMAN was also in favour of operation.

Mr. STANFORD CADE said that all acute appendices should be removed early and then there would be no abscesses and fewer cases of peritonitis. He classified appendicitis into two groups—the early in which the surgeon operated, and the late in which the undertaker officiated. Very few surgeons could say what a particular appendix would do; the risk of operation was known and justifiable; the risk of waiting was unknown and unjustifiable. Conservatism in operation was in direct proportion to the amount of arterio-sclerosis in the surgeon's arteries. There was only one treatment for appendicitis.

Dr. WALKER (Sydney) argued that no surgeon was thinking of making appendicitis a medical disease. It was a disease that must be treated by operation; but the question was: when? In some cases it was wise to stay the hand. The question was one of life. The figures demanded some improvement in treatment, and the improvement lay in the selection of cases. Young men need not fear the difficulty of

judgment; in 20 years' time all surgeons would be able to make the decision with ease.

Mr. M. J. PETTY agreed that early cases should have immediate operation, but if complications arose the younger man should seek help. In the Argentine patients travelled great distances to hospital, and signs of previous perforation were sometimes found. Many cases could survive non-interference. For amœbic appendicitis operation should be immediate.

Mr. COPE, in reply, pointed out that "early" cases were not mentioned in the motion; Mr. Cade's remarks were beside the point. The motion declared that every case was to be operated on immediately, however ill the patient, however bad the conditions, however inexperienced the surgeon. Every speaker on the other side had immediately begun to make excuses and beg the terms at issue. Only through bitter experience, and not arterio-sclerosis, had Mr. Cope come to the opinion that there were some few cases which should be left, and if there were some few cases the motion must be lost.

Mr. VICK accused Mr. Cope of playing with words. Nobody in his senses would operate on a patient dying of acute peritonitis. The people who had spoken against operation had failed to appreciate the danger of spread. General practitioners taught to watch their cases would not call in surgeons to help them.

The CHAIRMAN, summing up, said that years ago he had opened a debate in favour of immediate operation. The really essential point in the debate had been entirely omitted: the aperient treatment. Patients never died of appendicitis; they died of its treatment. All acute appendicitis was obstructive, and if no aperient treatment were ever given no case would ever become really active. He had never seen a gangrenous perforated appendix in which an aperient had not been given and had not been the cause of the flagrancy. No danger would derive from expectant treatment if aperients were withheld and if nothing whatever—particularly not water—were given by the mouth. A single drop of water caused intense writhing activity of the ileocæcal valve. Geographical and surgical conditions might be bad, but if they were satisfactory and the case was seen early there could be no question at all that operation was the best thing, and no patient ought to be lost. The question could not be answered with an absolute affirmative or negative, but only by the exercise of clinical sagacity. Only in children was the greatest expert apt to be at fault; no child should be left alone with his appendix for half an hour. Whatever the surgeon might feel about prognosis he must inevitably and without exception operate if an aperient had been given. If not, the best conditions might be sought even at the price of some delay.

On a show of hands the motion was declared passed by 54 votes to 49.

MEDICAL SOCIETY OF INDIVIDUAL PSYCHOLOGY

AT a meeting of this society held on March 9th, with Prof. W. LANGDON BROWN, the president, in the chair, a paper on the

Psychological Surroundings of the Surgical Patient

was read by Mr. W. MCADAM ECCLES. He began by speaking of some general aspects of his subject, including the terror with which the word "operation" fills many people. He then considered specifically the characters taking part in the drama of the surgical operation. The general practitioner, he said, took the part of the prologue. He selected the surgeon; and incidentally his implicit confidence in the man he chose was a valuable preliminary to the establishment of that mutual confidence between surgeon and patient. But not only confidence of the sufferer in the surgeon, but confidence of the surgeon in himself and in his team was essential. Certain minor pre-operative details helped to render the mood of the patient suitable for undergoing an operation. It was of value to permit him to enter the hospital or nursing-home two nights before the operation. On the first night the bed was strange and the surroundings unfamiliar, so that in any case sleep might not be good, especially if an aperient was given. It was better to give the aperient early next morning, and to allow the bowels to act during the day. The second night could be made more comfortable by a simple sedative, and a small, hot cup of tea should replace a distressing early morning enema. The time of the operation should be fixed definitely, and the patient should be in the hands of the anæsthetist five minutes before. Those last five minutes before the hour were apt to be filled with dread, and the minutes after were regarded with veritable horror.

Speaking of the psychological effects of local, spinal, or rectal anæsthesia, Mr. Eccles pointed out that some people dread loss of consciousness. On the other hand to be wholly or partially conscious during an operation might have a disagreeable and lasting effect upon memory, even upon mentality. In addition, a very definite, though often unmeasurable mental element entered into the causation of "shock."

The period after the operation was also important. To find oneself alone when returning to consciousness might be a real shock, and to be deadly sick without a receptacle for the vomit was very distressing. Nothing in convalescence was more encouraging than the prospect of a speedy recovery, if such could be foretold. If, on the other hand, the surgeon knew that recovery might take a long time, it was well to introduce this necessity gradually to the patient's mind, and to prepare to mitigate its irksomeness.

A discussion followed.

ROYAL ACADEMY OF MEDICINE IN IRELAND

A MEETING of the section of medicine was held on March 3rd, with Dr. W. G. HARVEY, the president, in the chair.

Pernicious Anæmia

Prof. HENRY MOORE and Dr. W. R. O'FARRELL described the case of a woman, aged 58 years, with anæmia, Addisonian in type, but with a normal curve of gastric hydrochloric acid in the fractional test-meal (done on three different occasions).

The patient, Dr. Moore said, complained of weakness, dyspnœa on exertion, looked sallow, and the appearance of the tongue was typical of pernicious anæmia (beefy-red, furrowed, with atrophic papillæ). The red cell count was 2,490,000 per c.mm., the leucocyte count 2000, the hæmoglobin 63 per cent., and the colour-index 1·32; there was a distinct megalocytic tendency, the average size of the red cells, with a Price-Jones count, being 8·13 μ; there was slight but distinct poikilocytosis, polychromatophilia, and punctate basophilia; no normoblasts were seen. The differential count was normal. The blood bilirubin was 1·9 mg. per 100 c.cm.

Liver treatment by mouth gave a reticulocyte response (10 per cent. in ten days) and in two months, with no other form of treatment, the blood count showed red cells 4,640,000, leucocytes 4800, hæmoglobin 100 per cent., and colour-

index 1·08; aniso- and poikilo-cytosis were slight, with absence of punctate basophilia and polychromatophilia, and the blood bilirubin content became normal. The patient has remained quite well up to date. She took liver extract or liver by mouth for one year but has discontinued the treatment for the past six months without relapse.

Dr. O'FARRELL said it was very uncommon to find a patient with pernicious anæmia with free hydrochloric acid in the gastric juice, but he felt very strongly that this case was one of pernicious anæmia. Megaloblasts were seldom seen except in very bad cases, and he would not lay much stress on their absence, because the patient's anæmia was never low enough to show them. He was of opinion that in any case the presence of megaloblasts was not sufficient to establish absolutely the diagnosis of pernicious anæmia.

The PRESIDENT agreed that pernicious anæmia without achlorhydria was very rare, but thought that Dr. Moore had made out a good case for their existence.

Dr. V. M. SYNGE suggested that pernicious anæmia was not a definite disease, and said that he frequently came across borderline cases which did not exhibit the complete picture of that disease, though they improved more under liver treatment than other cases of anæmia did.

Dr. W. R. F. COLLIS said he had under his care a patient who was exactly the opposite of Dr. Moore's. The case was one of microcytic anæmia with achlorhydria, and iron had no effect at all on the condition. He had given iron and was now giving vitamin C, in the form of a tumblerful of orange juice three times a day.

Dr. G. T. O'BRIEN referred to the case of a woman, aged 38, who was suffering from pernicious anæmia. A test-meal a week after admission gave a high gastric curve and demonstrated the presence of free hydrochloric acid in the stomach. She was treated by Hepatex and improved rapidly. In the first blood count nucleated red cells were found, but not in subsequent counts. Tests of fæces for occult blood were negative.

Dr. GEOFFREY THOMPSON said that pernicious anæmia, as originally described by Addison, undoubtedly included a number of cases which nowadays would not be given the name. The question now was, What is pernicious anæmia? He thought that it should be regarded not as a definite disease but as a syndrome characterised by certain features—namely, anæmia, increase in the size of the red cells, active destruction of the red cells in the body, and achlorhydria. It was only when the disease was in the stage of active hæmolysis that any reaction from liver treatment would be obtained.

Dr. MOORE, in reply, said he thought that undoubtedly there were borderline cases, but he himself had never come across one.

Dr. MOORE also showed a patient with atrophy of the metatarsals and of the phalanges of the feet; Dr. SYNGE showed a patient with a lump on the skull; and Dr. G. BEWLEY described a case of peripheral neuritis followed by acute necrosis of the liver.

CORRIGENDUM.—Dr. E. ff. Creed writes: "The report of my remarks at the last meeting of the Medical Society of London (as given on p. 475 of your issue of March 4th) omits the vital point in establishing the diagnosis of this ten-day case of undulant fever—namely, that the agglutination tests were repeated four days later—i.e., 14 days from the onset, and four after the temperature had fallen, and the agglutinin titre to *Br. abortus* had then risen to 1 in 200."

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY

A MEETING of this society was held at the University, Sheffield, on Feb. 24th, with Prof. LEYLAND ROBINSON (Liverpool), the president, in the chair.

Gynæcological Cases

Prof. MILES H. PHILLIPS showed a specimen demonstrating an unusual source of severe *post-menopausal bleeding.*

The patient, a multipara aged 61, had two severe floodings 15 years after the menopause. Her regular periods had ceased in 1916 at the age of 44. Thereafter she had a period lasting five or six days in the February of each second year until 1930, when she had a menstrual-like loss lasting for six months. At no time had there been any pain or discharge.

On examination the cervix was free from any signs of new growth and the uterus was felt to be rather larger than a cricket ball. On the assumption that the case was one of malignant disease of the corpus uteri a panhysterectomy was performed without preliminary curettage. The specimen showed a hard fibroid projecting into the cavity of the uterus, the mucosa being slightly ecchymosed in several places and showing a black area suggestive of a clot in a small vessel.

Prof. Phillips concluded that the source of the hæmorrhage was a ruptured vessel in the capsule of the fibroid.

The PRESIDENT and Dr. M. DATNOW (Liverpool) showed a case of *very early tubal pregnancy.*

The patient, a parous woman of 36, was admitted to hospital on account of some slight menstrual irregularity which led her doctor to suspect ectopic gestation, her last period being a week overdue and having been followed two days later by acute pain in the lower abdomen. Bimanual examination failed to reveal any pelvic abnormality, but posterior colpotomy revealed two small blood clots in the pouch of Douglas, so laparotomy was performed. There was no free blood in the peritoneal cavity but the left tube was found to be distended to the size of a man's little finger, with a distinct bulge about its mid-point. There were no adhesions to surrounding viscera. The tube was removed and the patient made a complete recovery.

Serial sections through the tube revealed embryonic elements in 120 sections through a thickness of 0·48 mm., and the sections showed that an ovum had become embedded in the submucosa of a plica at the blind end of a diverticulum and had developed in the tissue between the lumen and the mesosalpinx.

They thought this was a very early example of an ectopic gestation where the ovum had perished at a time antecedent to that in which the trophoblastic epithelium is differentiated into branched processes containing mesothelium, and they considered the ovum, as shown by the sections, to be a little more than a week old.

Mr. W. GOUGH (Leeds) showed a case of a *sarcomatous polypus* treated by radium and later by hysterectomy.

A woman, aged 46, gave a history of the passage of clots per vaginam for 16 days, and between the passage of clots there had been an offensive discharge. She had had slight pain in the lower abdomen and also some difficulty in the commencement of micturition for one week. Examination had revealed the fundus uteri one inch above the symphysis and a large rounded smooth mass protruding from the cervical canal through a widely dilated cervix. At operation the mass was found to be very friable and as much as possible was removed piecemeal, but examination showed a considerable amount of growth still within the uterine cavity. Radium was inserted in the uterine cavity for 75 hours, the total dosage being 4160 mg.-hours. Pathological examination showed it to be a polymorph-celled sarcoma. One week later she was readmitted to hospital and panhysterectomy was performed. On pathological examination of the uterus no trace of sarcomatous tissue could be found in four separate areas.

Prof. PHILLIPS also demonstrated a case of antepartum moulding of the head in a breech presentation due to oligohydramnios.

MEDICAL SOCIETY OF LONDON

Chronic Pancreatitis

Sir JOHN BROADBENT took the chair at a meeting of this society held on March 12th, and Mr. A. J. WALTON opened a discussion on Chronic Pancreatitis.

THE SURGICAL SIDE

He described an investigation he had undertaken into 165 cases of cysts, pseudo-cysts, calculi, and chronic pancreatitis, and 47 cases of pancreatic carcinoma. Chronic pancreatitis with calculi was, he said, very rare, but the differentiation between the interlobular and the interacinous forms was important. A pseudo-cyst was caused by an extravasation about the pancreas, usually from trauma; a symptomless tumour appeared and pain intervened later, and a large cystic cavity was found above a normal pancreas. About half the true cysts started as cystic adenomata; they were neoplasms which had undergone a cystic degeneration. Others might be due to definite obstructive lesions in the head of the pancreas. Primary chronic pancreatitis had an ill-defined pathology and was closely related to the acute and subacute forms. The changes were definite enough at autopsy, and fell into two groups: those in which the fibrosis was distributed regularly through the pancreas, and those in which its distribution was more irregular and nodular. At operation it was difficult to detect owing to lack of knowledge of the characteristics of the normal pancreas. Moreover, the irregular type of chronic pancreatitis might be localised to the head of the gland, and be found almost if not quite indistinguishable from carcinoma. Evenly distributed fibrosis led in some cases to a shrunken, distorted, atrophic condition. Under the microscope the two main groups were easy to determine; in the interlobular group relatively large masses of the gland were cut off by fibrosis, and there was thickening and irregularity which did not interfere much with the gland unless it obstructed the common bile-duct. In the interacinous type the fibrosis ran regularly through the gland and tended to interfere with the islets of Langerhans. The two groups might overlap.

A number of cases developed diabetes later—in Mr. Walton's series 4 out of 61. Two cases had developed carcinoma. Conversely, out of 47 cases of carcinoma of the pancreas 4 had previously suffered from chronic pancreatitis. Careful attention to the symptoms could almost entirely obviate misdiagnosis: only one case of carcinoma had been mistaken for chronic pancreatitis, and only one of chronic pancreatitis for carcinoma. His series had, he said, included 30 men and 31 women, and the commonest age had been between 40 and 60. He had not met the disease in adolescents. It was becoming more and more difficult to believe that infection reached the pancreas by the common bile-duct. Evidence was accumulating to suggest that it passed from the gall-bladder by the lymphatics, and that it might be blood-borne.

Symptoms fell into three groups—diabetes, jaundice, and pain. Mr. Walton said that, for administrative reasons, he saw very little diabetes. The majority of cases had obstructive jaundice. The onset of the jaundice was slow; there might be a premonitory attack with freedom for several months, after which the condition progressed with definite characters. The patient lost the bright orange-red of gall-stone jaundice, and became green and grey, and bile disappeared from the stools and appeared in considerable quantities in the urine. Itching became intolerable. Pain, in the early stage, was that of periodic dyspepsia, and might, like jaundice, be manifested in a premonitory attack. It was something like that of peptic ulcer, but there was "something wrong," and the clear-cut ulcer history was absent. If the patient did not come until pain was continuous there was a danger of the misdiagnosis of carcinoma, but there were often superadded attacks of acute pain like that of biliary colic. Sometimes pain was added later to jaundice. Except for the determination of the undigested fat content and of the diastase index, chemical tests were not of great value. X rays had been helpful in a negative way; sometimes a large mass might be seen indenting the duodenum, but the appearance was more common in carcinoma of the pancreas.

The treatment of the diabetic case was essentially medical, in the absence of gross gall-bladder disease. When there was a mild degree of pain suggestive of gastric or duodenal ulcer, and when the patient's weight was reduced, the case was probably one for medical treatment, but it was difficult to make an accurate diagnosis without operation. Calculi must be operated upon. To relieve obstructive jaundice it was necessary to form an anastomosis between the dilated gall-bladder and the stomach or duodenum. This operation was not free from risk. Cases without jaundice fell into three groups. Those with little evidence of obstruction and marked evidence of gross gall-bladder disease were treated by cholecystectomy, the common duct being explored. When the lesion of the gall-bladder was mild and there was a possibility of dilatation of the duct, Mr. Walton did a cholecystoduodenostomy. In mild or invisible infection of the gall-bladder with no obstruction there were two possibilities: cholecystectomy and drainage, or medical treatment after simple laparotomy.

THE MEDICAL SIDE

Sir WILLIAM WILLCOX said that diagnosis was a matter of elimination and was usually made by the surgeon. There were no reliable laboratory tests and no objective signs, for the pancreas could rarely be palpated, and was transradiant to X rays. Diagnosis, therefore, depended largely on subjective symptoms, but in some cases there was a tendency to profuse hæmorrhage. Sir William thought that in many cases, particularly those associated with calculi, infection spread up through the duct, and also that infection might be blood-borne. The ætiology fell into four groups. The most important one was where the pancreatitis was secondary to infections of the gall-bladder and intestinal tract. It might also be due to a general blood infection such as typhoid, food poisoning, or exanthemata, and occasionally to syphilis and tuberculosis. It might follow poisoning by chemicals such as alcohol and lead; and it might be associated with some other lesion of the pancreas, such as cysts, calculi, or traumata. Chronic pancreatitis might resemble a gastric lesion, and might be associated with obstructive jaundice or with diabetes.

It was important to do the van den Bergh or icterus index test for latent jaundice. The urine diastase might be immensely raised, and a low diastase reaction was a strong nidication against pancreatic disease. Glycosuria was not common. The blood-sugar test and glucose-tolerance curve were not sufficiently often determined; in advanced disease there might be a positive result. An increase of fat in the stools was an important sign. If salol and saladine were given, salicylic acid and iodine respectively might be excreted in the urine. Sahli's

test—the administration of methylene-blue or iodoform in a gelatin capsule hardened with formalin—was useful.

Medical treatment was disappointing in many cases. Associated lesions should be dealt with, and infection of the intestine by non-lactose fermenting organisms should be combated by irrigation, vaccines, and antiseptics. Saline aperients and iodides might be given. The dietary should be fat free, carefully selected, and pancreatin and alkalis might be administered to aid digestion.

THE CHEMICAL SIDE

Prof. E. C. DODDS said that chemical tests were of very little assistance, because the pancreas, like the liver, had such a large reserve of efficiency. The diastase test was absolutely valueless in chronic pancreatitis, though in the acute form it might be of great value when it showed over 200 units. There was no reason why the diastase should be high in a destructive lesion of the pancreas, and the content depended on many factors other than the pancreas itself. Sixty to 100 units might be found in a normal subject. Glycosuria, unless very severe, was not a reliable index of pancreatitis. The glucose-tolerance test had been a complete failure. The fat content of the fæces was always very high in acute pancreatitis, but the normal variation was much wider than the orthodox figure of 25 per cent.

DISCUSSION

Mr. ZACHARY COPE described a case of pancreatic dilatation due to gummata. He asked whether Mr. Walton ever found any difference in the dilatation of the duct in chronic pancreatitis and in carcinoma; he had found the pancreatic fluid under great pressure in two cases of neoplastic obstruction.

Dr. G. E. VILVANDRÉ said that he had visualised pancreatic calculi by X rays in six cases.

Mr. MCNEILL LOVE suggested that chronic pancreatitis might affect the prognosis in abdominal and gall-bladder infections.

Mr. W. E. TANNER gave a warning against the hasty removal of the gall-bladder when the abdomen had been opened for chronic abdominal pain and nothing had been found. Mr. Walton's operation, he said, for choledocho-duodenostomy was rather a difficult and dangerous one. He asked the minimum pathological appearance of the gall-bladder which would justify its removal.

Mr. L. E. NORBURY pointed out the uncertainty of differential diagnosis between carcinoma of the head and chronic pancreatitis, and suggested that the surgeon should not be too pessimistic in telling his prognosis to the relatives.

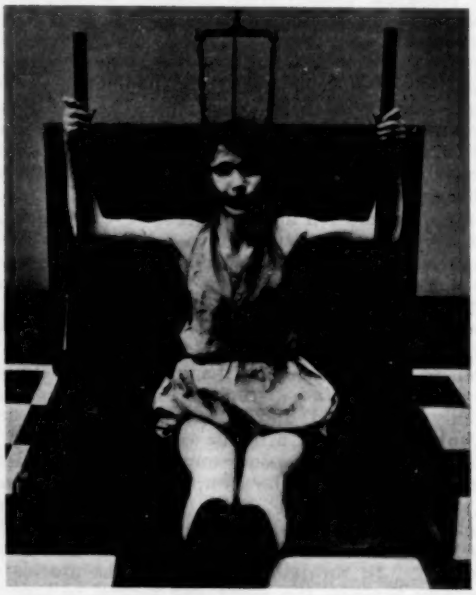
Mr. PHILIP TURNER described a case of gummatous infiltration of the alimentary tract which had strongly resembled cancer. He deduced the lesson that, in encountering an unusual and unexpected condition in the region of the pancreas, one should always bear syphilis in mind.

Mr. WALTON, in reply, laid stress on the analysis of the patient's history as the chief means of diagnosis. The pain was more or less characteristic in its periodicity and in the amount of flatulence associated with it; it was present at night, and not relieved by food, and it alternated with short attacks of severe pain running to the left shoulder. The surgeon was, he said, never justified in removing the viscus purely on symptomatology, and he did not remove a gall-bladder unless it was grossly diseased. If a gall-bladder were white or grey instead of blue, he might explore the interior.

NEW INVENTIONS

BENTLEY PORTABLE HEAD-SUSPENSION APPARATUS

THE simple piece of apparatus shown in the illustration is really a portable Fisher frame. On the back of the upright board is a vertical steel mast carrying the usual transverse bar and head sling. The mast can be adjusted so that any patient of reasonable size can be suspended with the buttocks clear of the floor board, thus allowing all the body-weight except that taken by the heels to act through the spine. The particular merits of this apparatus are: (1) it eliminates the fright and faintness that some children experience when slung from the ceiling



or from a high bar; (2) the flexion of the hips counteracts any tendency to lumbar lordosis; (3) the arm bars at the side allow the child to brace the shoulders and spine against the frame during the performance of deep-breathing exercises; (4) the child can release herself from suspension when necessary, thus saving the masseuse the trouble of having to leave another patient to release the child who is suspended; (5) its portability and its low cost.

This apparatus may be used for the post-operative treatment of torticollis and for the treatment of all spinal defects in which suspension is desirable. It was designed by Miss Bentley, who is in charge of the remedial exercises clinic at the Royal National Orthopædic Hospital, Great Portland-street, where it is now in constant use. It has been ordered, or is being installed, at a number of the clinics in connexion with the hospital, for it appears to have many advantages over the usual type of suspension apparatus.

It was originally made in the workshops of the hospital, but may now be obtained from Messrs. Stanley Cox, 39, Gerrard-street, London, W.1.

H. J. SEDDON, F.R.C.S.

WESTMINSTER OPHTHALMIC HOSPITAL.—At the annual meeting last week Colonel Arthur Brodrick, who presided, stated that the ordinary income last year, nearly £21,000, was the highest on record. The debt to the bank, which was £15,000 three years ago, has been reduced to £5750.

REVIEWS AND NOTICES OF BOOKS

The Sputum

Its Examination and Clinical Significance. By RANDALL CLIFFORD, M.D., Associate in Medicine, Peter Bent Brigham Hospital; Assistant in Medicine, Harvard Medical School. London: Macmillan and Co., Ltd. 1932. Pp. 167. 20*s*.

THIS book is a plain straightforward account of the examination and clinical interpretation of sputum, suitable for the senior student and the newly qualified practitioner. In order to avoid confusion, Dr. Clifford has limited the scope of the book to the more common diseases of the lungs and bronchi, though he occasionally strays into new and untrodden bypaths, as in describing the sputum of pulmonary asbestosis. The laboratory methods chosen for description are simple and practical, requiring little elaborate apparatus. We note the practitioner is advised not to attempt the typing of the pneumococcus himself but to send the material to a recognised laboratory. This appears to us to be a wise precaution, since there are pitfalls which only experienced laboratory workers are likely to be cognisant of. The last third of the book is devoted to a discussion of the sputum in some of the more common diseases of the respiratory system. These include various forms of bronchitis, asthma, pulmonary tuberculosis, lobar pneumonia, and other diseases. A good description of the bronchial spirochætes found in gangrene and bronchiectasis is also included. The book is plentifully supplied with good illustrations of various organisms in sputum, Curschmann's spirals, fibrinous casts, asbestosis bodies, Charcot-Leyden crystals, and elastic tissue. Although these are largely pictures of material familiar as illustrations to readers of most of the ordinary text-books on clinical pathology and laboratory methods, it was doubtless necessary to include them, and they are well and clearly reproduced.

Hitherto the only monograph available on this subject has been the large standard German work of von Hoesslin, which is too elaborate and costly for the student, though it is invaluable for the expert. This book has therefore a definite value for students and practitioners.

Albert Schweitzer

My Life and Thought: an Autobiography. Translated by C. T. CAMPION. London: George Allen and Unwin, Ltd. 1933. Pp. 288. With portrait and illustrations. 10*s*. 6*d*.

Dr. Schweitzer—a doctor three or four times over—is well known as a remarkable personality who collects money for his mission hospital in the French Congo by interpreting Bach on English organs; to some also as the modernist theologian who wrote "The Quest of the Historical Jesus." This singularly frank and artless account of what he has done and what he has thought makes a most interesting tale, though the translation is not always as good as it might be. Philosophy, theology, a pastor's work, music, and finally medicine kept him so busy that he never seems to have had any doubts that he was well occupied, and his versatility and competence must leave any ordinary reader a little breathless. Through it all he is consistently and intensely individualistic; it was indeed this characteristic which brought him to the mission field as a medical man rather than as an unorthodox clergyman whose style might have been cramped by sectarian considerations. So are many great men made. David Livingstone put it on record that when people offered him advice he "excused them on the score of being a little soft-headed in believing that they could think both for me and for themselves."

A Text-book of Midwifery

Sixth edition. By R. W. JOHNSTONE, M.D., F.R.C.S. Edin., Professor of Midwifery and Diseases of Women in the University of Edinburgh. London: A. and C. Black. 1932. Pp. 447. 18*s*.

IT is now nearly 20 years since the first edition of this text-book was published. During this time it has established itself as one of the most popular manuals of midwifery in the English language. It is simply and clearly written, the arrangement is excellent, and the illustrations being mostly semi-diagrammatic are much more useful than the complicated pictures commonly seen. This new edition contains an excellent chapter on the recent work on menstruation and the functions of the endocrine system on the reproductive organs in the female. The chapter on the toxæmia of pregnancy has also been rewritten. This difficult condition is discussed in a practical manner and, if the teaching cannot yet be based on scientific principles, it does give the reader a sound idea of how to manage his cases. We can hardly approve the advice to remove the placenta manually in placenta prævia. The danger of post-partum hæmorrhage after an ante-partum hæmorrhage is well recognised, but to advocate manual removal almost as a routine seems to be dangerous. A survey of reports of maternity hospitals shows that manual removal seems to have been unnecessary in a considerable number of cases, and the risk of sepsis is so grave that it should not be increased without real need. No mention is made of Willett's scalp forceps in the section on the treatment of placenta prævia. Omissions are, however, few in number and unimportant in character, and the new edition should maintain the reputation of this admirable text-book.

1. Syllabus of Medical History

By VICTOR ROBINSON, M.D. New York: Froben Press, Inc. 1933. Pp. 110. $1.

2. A Short History of Surgery

By Sir D'ARCY POWER, K.B.E., F.R.C.S. Eng. London: John Bale Sons and Danielsson, Ltd. 1933. Pp. 91. 7*s*. 6*d*.

3. Science and Superstition in the Eighteenth Century

By PHILIP S. SHORR, Ph.D. London: P. S. King and Son. 1932. Pp. 82. 7*s*. 6*d*.

1. Dr. Robinson is professor of the history of medicine in the Temple University School of Philadelphia, and his book is written in the form of questions and answers. The former have always a wide range and the latter can consequently only be supplied by wide information. Such a question as "Name some medical contributions to biology" would certainly leave a vast choice of material in any response, and probably not half a dozen biologists would make the same list of pioneers in biological work particularly connected with medicine. The reply furnished by Dr. Robinson is a brief one, but the fact that he is able to answer the question in a manner that would be useful to students indicates that he

has chosen a task for which he is well fitted. Other useful material is found in the answers appended to questions concerning the significance of the work—for example, of Purkinjé, Claude Bernard, Henle, Pasteur, Koch, Röntgen, and Freud. The book ends with an essay extracted from the author's book "Pathfinders in Medicine" and a specimen chronology. The essay is included as an example that may be followed by others in summarising the work of a distinguished predecessor. In the chronology, which deals with the subject of goitre, the author points out how valuable a carefully dated history of a particular disease may be to the real understanding of its nature and treatment. At the end of the book will be found reproductions from statues, vases, anatomical preparations, and papyri of primitive and Egyptian medicine.

2. Sir D'Arcy Power designs here to create interest in the works of the old writers on surgery. He gives the words of the veterans, in which they laid down either their theories or the actual procedure in the application of those theories; he points out that most of the works in a foreign tongue, from which he quotes, have been translated into English, and that as a rule not only is reference to the literature easy but the actual works themselves can be purchased. The great merit of this small volume is the way in which the continuity of the development of surgery becomes apparent. Particular discoveries and procedures make signposts, but individual developments can generally be seen to have rested on previous work, becoming themselves the signposts of development.

3. Dr. Shorr's book is an analysis of two well-known works—Chambers' "Cyclopædia," published in London in 1728, and Zedler's "Universal Lexicon," published in Leipzig some few years later. Within less than 100 pages Dr. Shorr is able to give an interesting summary of accepted science as it stood in the eighteenth century, and his analyses of these two encyclopædias bears out his conclusion that the considerable scientific revolution which took place in the seventeenth century in no way effected a complete overthrow of the real learning and the allied superstitions of earlier times. A remarkably full bibliography testifies to the industry of the author and supplies the reader with full opportunity for going to the original sources. "When does mediæval science end and modern science begin," he asks, his object in studying these particular compendiums being to discover the extent of change and of continuity in scientific ideas. The brevity of the volume prevents any exact answer being given to such a question, but the writer, from a wide range of knowledge, supplies us with much material from which to frame opinions as to the reply. This is an interesting book.

Incomparable India

By Colonel ROBERT J. BLACKHAM, C.B., C.M.G., D.S.O. London: Sampson, Low, Marston and Co., Ltd. 1933. Pp. 302. 12*s*. 6*d*.

Colonel Blackham writes with enthusiasm. He sketches briefly and picturesquely the early history of India—mere notes these may be but they form an adequate introduction to the scenes and situations of to-day. Chapters on the might of Hinduism, the rise of Buddhism and its modern significance, and on the influence of the Mahometan creed supply comprehensible reasons for many of the grave troubles which have so distracted both the British rule in India and the native designs for ruling themselves. Other chapters on pilgrims, festivals, and fairs, on sacred streams and holy cities, on temples and mosques, give in their contents and their appropriate illustrations justification for the title of the book, for there is no country in the world which will compare with India along magnificently picturesque lines. The medical side of the work is represented by chapters on the ancient Indian medicine, on medical officers to "John Company," whose part in the history of the Empire is well known, and the Indian Medical Service and the civilian medical service. Colonel Blackham tells us the present position of Western medicine is that the practitioners of modern medicine number but a mere fraction of the professors of healing in India, and he notes that in certain quarters there is a revolt against Western medicine which he finds, despite certain virtues in the indigenous systems, must be a retrograde step.

In his closing chapter Colonel Blackham develops the thesis that the peoples of India have been welded into a nation, so far as this has taken place, by the agency of British administrators, and while contact with the west has brought to India the fruits of modern civilisation, progress is hampered by ancient prejudices and customs.

Sex Determination

By F. A. E. CREW. London: Methuen and Co., Ltd. 1933. Pp. 138. 3*s*. 6*d*.

WITH his usual clarity Prof. Crew here condenses a great deal of information into a small space in his account of the genetics and cytology of the determination of sex. Fundamentally, sex is determined by the mechanism which decides the distribution of the sex chromosomes, though the final result may sometimes be overridden by other influences. The book is written on this basis and older theories and guesses are not considered. We do not know of any book in which the facts and their interpretation are stated more plainly and in such a readable form, though those who are not familiar with the subject will naturally find that it needs close study.

Alcohol and Man

The Effects of Alcohol on Man in Health and Disease. Edited by H. EMERSON, M.D. London: Macmillan and Co., Ltd. 1932. Pp. 451. 18*s*.

THIS book sets out once more the simple known facts about alcohol. It might be questioned whether there was any need for the 23 contributors and the editors to go to the trouble to put it together when the Medical Research Council's "Alcohol: its Action on the Human Organism" (1924) and "A Review of the Effects of Alcohol on Man" (1931) were available. However, it contains some interesting recent statistics, and an American book will no doubt have more effect in America than those coming from this country. It covers in a thoughtful and competent way the various aspects of the influence of alcohol on body and mind, in health and disease. It is not very easy to choose between one chapter and another, but perhaps that by Prof. W. R. Miles, on the psychological effects, is the best if only because it contains the pith of the problem, and for the ordinary man answers the question whether he should drink or not: the English-speaking world is now relatively sober in a gross sense, and a dilatory reaction time on the road may mean as many deaths as cirrhosis of the liver used to provide.

THE LANCET

LONDON: SATURDAY, MARCH 18, 1933

THE INTIMATE NATURE OF NERVOUS ACTIVITY

THE introduction to the report of the Medical Research Council for the year 1931–1932, of which mention was made in our last issue (p. 541), contains some interesting if brief reviews of various aspects of medical research. Among these is one dealing with disorders of the nervous system, and the comment, which is both shrewd and true, is made, that neurology awaits assistance from the physiological and chemical side. Its clinical study will doubtless continue, as always, to add to knowledge, although the report rather hints that the wave of progress originated years ago, in the heyday of JACKSON, GOWERS, FERRIER, and other pioneers, has in great measure spent itself. Whether this genuinely represents the situation is open to discussion; but at all events the neurologist with a scientific turn of mind is indeed well aware of his limitations on the purely clinical side, and finds himself faced with problems, arising out of that study, which are much more easily posed than answered. A single example may be cited; the clinical investigation of narcolepsy and cataplexy brings him up against questions of inhibition; he can observe and describe, but his explanation at present is speculative largely because of his (and others') ignorance as to what inhibition really means. He is in advance of the experimentalist (this fact is too frequently overlooked, and his observations in consequence rather depreciated) who has not begun, so far as we are aware, to seek the reproduction of such remarkable clinical phenomena in the laboratory. Yet both physiologist and chemist are slowly but surely aiding the clinician on this very point, for much of their work in recent decades has dealt with the intimate nature of neural processes.

The nerve impulse, to begin with, is not a particular and mysterious form of energy. There is no such thing as "nervous energy" in any special sense, hackneyed though the term is. The nerve impulse may be considered as an event; it is a something which is transmitted along a protoplasmic thread like an electric cable with conducting core and insulating cover. In his latest little book Prof. A. V. HILL[1] shows clearly that certain things happen invariably as this transmission occurs; these are (1) an electric change, which can be used as a sign of the presence of the impulse and a measure of its size; (2) heat formation; (3) oxygen consumption; and (4) carbon dioxide production. The magnitude of the impulse is not susceptible of variation; the principle of its action is "all-or-none"; its passage is followed at once by a refractory period; in Prof. HILL'S words, "a gun has been fired; nothing can happen till it is reloaded." Hence "summation" of impulses is impossible—for at the moment during which one impulse is occupying the "wire" another cannot be added to it. The state of affairs, however, is different in respect of nerve-cell activities. A nerve cell can be excited or depressed in its function; this is effected by the arrival of impulses at the cell, yet its proper processes are not comparable with conduction. They can be "summated"; that is to say, a nerve cell can be in a condition of subliminal excitation, or, for that matter, of subliminal depression or inhibition, and can be made to discharge, or to inhibit, by the addition of more impulses. Evidently, then, the nature of the processes in these two parts of neural tissue is different. Under what circumstances an impulse arriving at a ganglion cell arrests activity on the one hand, or stimulates it on the other, still remains obscure. The clinician is well aware of this fact of observation; the physiologist has to come to his rescue, since the former can get no farther by means at his disposal. Once more, despite the frequency, nay the constancy, with which inhibition and excitation are encountered in nervous function, and (shall we say?) the glibness with which they come to the clinician's lips, their exact connexion with each other requires elucidation. One is not just a reversal of the other, so to speak; nor is inhibition comparable with the refractory phase of nerve transmission, but is something sui generis. Still less is it merely absence of excitation; it is a positive process, taking measurable time for its performance.

Perhaps some light will be thrown on these physiological arcana from a somewhat different angle. When currents flow, ions must move. Prof. HILL believes that the process of recovery—that is, as represented by the stage of refractoriness in transmission—can be likened to a process of secretion. He thinks that recharging (in an electrical sense) and secretion (in a physiological sense) are comparable. Possibly this secretory process forces back to their place ions whose diffusion has caused the electrical change observed during the passage of the current. Prof. G. H. PARKER[2] of Harvard also seeks to utilise the conception for an explanation of nervous activity. He adduces evidence which suggests that some substance in the nature of a hormone may be given out by nerve fibrils or terminals, and which, too, seems to show that the synapse (playing an all-important rôle in excitation and inhibition) has a secretory and a receptive side, and, further, that these are structurally different. Though the distance between the origin of this postulated hormone or secretion, and its point of application, may be microscopical, nevertheless its principle is but a special instance of BAYLISS and STARLING'S concept of hormones. There can be no doubt that nerve cells respond not merely to neural stimuli but also to humoral stimuli; that is, they have a dual control. And it is conceivable that the

[1] Chemical Wave Transmission in Nerve, Cambridge, 1932.

[2] Humoral Agents in Nervous Activity, Cambridge, 1932.

differences, sketched above, between excitation and inhibition may be determined in part at least by secretory differences.

A NEW STUDY OF NEPHRITIS

A NEW study of nephritis, prepared by Dr. JOHN GRAY, has been issued as a green book by the Medical Research Council.[1] In this report, based on observations carried out upon a large series of cases (over 500) at the Aberdeen Royal Infirmary and the Royal Aberdeen Hospital for Sick Children, Dr. GRAY approaches the question of the recognition and classification of types of Bright's disease from a combined pathological and clinical standpoint. The result is a scheme of conservative design, which, it is implied, was worked out before the publication of Dr. DOROTHY RUSSELL's monograph as one of the same series of special reports (No. 142) in 1929. In an introductory section Dr. GRAY notes that examination of the kidneys in his series indicated divergencies in interpretation too great to allow of fair comparison by means of a simple tabular pairing of corresponding groups in the two classifications. He has, however, tried to bring his elaborate scheme into relation with that adopted by Dr. RUSSELL. He recognises an "acute nephritis," in all respects similar to the acute or hæmorrhagic nephritis of other workers, which can pass through a subacute or intermediate stage into "chronic nephritis." This same group of chronic nephritis includes that common form in which the patient is discovered with advanced renal insufficiency and raised blood pressure but without an antecedent history of an acute or subacute phase (the "nephritis repens" of Russell). In keeping with modern tendencies the terms parenchymatous and interstitial are omitted.

In dealing with the question of nephrosis GRAY keeps strictly to MUELLER'S original definition of this condition—namely, a pathological state of the kidney in which the changes are purely degenerative, or in which the inflammation present is questionable. That form of nephritis which has been widely called nephrosis, or in Russell's nomenclature "nephritis mitis" is recognised by GRAY as having an inflammatory basis and is called by him "nephrotic nephritis." He differs from RUSSELL, however, and from most other authors in finding that proliferative changes are present in the glomeruli and that transitions exist between this form and acute nephritis (the "nephritis acris" of RUSSELL). He believes, although no specific evidence is adduced on this important point, that examples of his nephrotic nephritis can pass in the course of years into a chronic stage in which albuminuria diminishes while uræmia and raised blood pressure become manifest. It is difficult to endorse this view. VAN SLYKE and his co-workers have recorded a case in which the state of the patient remained unchanged during a period of 17 years.[2] Subsequently both the arteriolo-sclerotic and the arterio-sclerotic groups of kidneys are considered. The arterio-sclerotic kidney is distinguished from the arteriolo-sclerotic kidney of essential hypertension, although some degree of hypertrophy of the left ventricle was observed in all the illustrative cases in this group. It is recognised that such patients do not present symptoms of renal insufficiency. In the essential hypertension group the position is not so clear. Although recent work on the kidney suggests a general measure of agreement that arteriolar degeneration in itself produces a characteristic focal form of cortical atrophy that is clearly distinguishable from the lesions of true Bright's disease and does not lead to renal insufficiency, GRAY finds that "the histology of the organs in essential hypertension provides no clue at all to the ætiology of the condition" (p. 170), and that "all the changes accepted as characteristic of chronic nephritis may be present." He states that he has been unable to identify with certainty the form of glomerular destruction that has been described by RUSSELL in hypertension. This means that if GRAY'S view is correct we are once more plunged into the old difficulty of separating histologically the kidneys with primary hypertension from those in which hypertension is secondary to Bright's disease.

The report is interestingly presented, and expressions of opinion founded on the study of a large series of cases are worthy of careful consideration. But opinions must be distinguished from ascertained facts especially where analysis of the observations leading to them is lacking. It is clear that considerable divergence of view still exists on the classification of nephritis. We welcome the publication of this monograph, since it is likely to stimulate further inquiry into the points of difference, and that way progress lies.

[1] Special Report Series No. 178. H.M. Stationery Office. 1933. Pp. 141. 2s. 6d.

[2] Medicine, 1930, ix., 257.

BRITISH POST-GRADUATE MEDICAL SCHOOL

BEFORE laying down office as the first Minister of Health in 1921 Dr. ADDISON appointed a committee to investigate the needs of medical practitioners and other graduates for further education in medicine in London and to submit proposals for a practicable scheme for meeting them. Within four months this committee, with the Earl of ATHLONE as its chairman, made the report which has formed the basis of all subsequent inquiry. The report recognised primarily that the principal defect of post-graduate medical education in this country was a lack of organisation and appropriate pre-arrangement, and it recommended the attachment to a hospital, centrally situated in London, of a school devoted solely to post-graduate education, this centre to be a school of the University of London receiving financial assistance from the Treasury through the University Grants Committee. The Athlone report contained two other far-seeing recommendations (1) for an institute of state medicine and (2) for an increased number of resident appointments and clinical assistantships in hospitals and poor-law infirmaries. These two points have been met: the first completely by the

establishment in 1922, owing to the generosity of the Rockefeller Foundation, of the London School of Hygiene and Tropical Medicine; the second in some measure by the transference of poor-law hospitals to the municipalities, which has resulted, in London at least, in an unparalleled increase of good internships. The realisation of the primary object of the Athlone Committee has tarried longer, and it was not until January, 1930, when a committee appointed by Mr. NEVILLE CHAMBERLAIN in 1925, with Mr. ARTHUR GREENWOOD as chairman, reported, that a practical suggestion opened the way for immediate action. This committee recommended "that the British Post-graduate Hospital and Medical School, comprising a hospital with 400 beds, a medical school, and residential facilities for post-graduate students, should be established on a site which will permit of its future expansion as its services to the science and art of medicine and to the public are developed and recognised, by means of the conversion of a public hospital—viz., the Hammersmith Hospital, at which the 400 beds initially required are already available."

The stage of accomplishment has now been reached by a decision taken last Tuesday at a meeting of the London County Council. An agreement between the Council and the School has been prepared and the Treasury, after consultation with the University Grants Committee, has approved this agreement and sanctioned the putting in hand without delay of the building operations. The plans provide for a medical school, for casualty, receiving, and out-patient departments in two new blocks, a new ward, and departments for such things as massage and light treatment. The new ward will result in a net increase of 28 beds for patients. It is interesting to note the way in which the central public health committee of the L.C.C. set out the advantages from the Council's point of view of the association of the Hammersmith Hospital with a teaching school. It will, they suggest, improve the medical and surgical treatment of the sick of London and enhance the value of the Council's hospital service. There will be a concentration at the School of the best medical and surgical skill available to teach on modern lines all members of the medical profession who take advantage of the facilities offered. It will thus be possible for members of the Council's medical staff to attend the School for post-graduate study, and the opportunities thereby given for instruction in the most modern methods should be of the greatest benefit to the Council's hospital service generally. In addition patients from any of the Council's hospitals can be sent to Hammersmith Hospital for the purposes of diagnosis and the specialised treatment available there.

The arrangement between Council and School will include the grant to the School of a licence to occupy the school premises for a term of 999 years at a barleycorn rent, the licence being determinable at any time on failure of the School to carry out its covenant. The number, nature, duties, and pay of the professional and technical staff of the school will be agreed jointly, but this side of the staff will be appointed and paid by the School. The nursing staff on the other hand will be appointed and paid by the Council. The domestic, engineering, and maintenance staff will be appointed and paid by the Council, the School repaying the proportion of the cost utilised by it. Either party may appoint and pay additional staff. The two parties will agree as to the number of students resident in the hospital, the present arrangement being that a quarter will be nominated by the Council and three-quarters by the School. The Council provide lodging and maintenance for all of them, recovering from the School the cost in respect of the School's nominees; but the Council will be entitled to the services of the whole of such students in connexion with the work of the hospital. The maintenance expenditure for the first full year is estimated at £23,940, and for later years at £22,665, but should any item of the maintenance expenses be excessive by reason of the presence of the School, the School is to pay some proportion of the excess. All these matters will be determined on the advice of a joint committee of eight members, nominated half by the central public health committee of the Council and half by the School.

ANNOTATIONS

AN INTERNATIONAL SYMPOSIUM ON CIRRHOSIS OF THE LIVER

THE conference habit initiated by our political leaders in the immediate post-war years seems to have taken a firm hold in governmental circles and to be spreading to other walks of life. There is much to be said in favour of international conferences provided that the subject to be discussed is carefully chosen as one in which definite results may be expected to emerge from a free interchange of knowledge. If, however, as sometimes happens, the known facts about the matter under consideration are available to all in the literature of the subject, and are insufficient to warrant the development of an agreed policy, it may be doubted if scientific congresses of the nations are worth the effort they entail. The International Association of Geographical Pathology was established in 1928 as an organisation for the study of the influence of race, environment, climate, habits of life, and so forth on disease. It owes its inception largely to the efforts of Prof. M. Askanazy, of Geneva, Prof. L. Aschoff, of Freiburg-i.-Br., Prof. De Josselin De Jong, of Utrecht, and Prof. C. Roussy, of Paris, and local committees have been formed in some 32 countries. The subject chosen for discussion at the first meeting of the association, which was held under the presidency of Prof. Askanazy in Geneva on Oct. 8th to 30th, 1931, was Cirrhosis of the Liver, and it was hardly to be expected that much new information would emerge from a conference on such a well-worn subject. Nevertheless, the proceedings of the meeting which have recently been published [1] contain much that is of interest and value. The conference was divided into five

[1] Comptes Rendus de la Première Conférence Internationale de Pathologie Géographique. Genève: Libraire Kundig. 1932. Pp. 367. Swiss Fr.10.80.

sections, each with its special reporter. Thus Prof. De Jong dealt with the liver in cirrhosis and Prof. R. Rässle with the condition of the organs in cirrhotic subjects. Prof. N. Fiessinger discussed the symptomatology of hepatic cirrhosis, Dr. W. E. Gye experimental cirrhosis in its relation to human disease, and Prof. F. C. Mann disturbances of metabolism in hepatic cirrhosis. Dr. Paul Robert contributes to the report of proceedings an appendix on statistics, classification, and ætiology. As might be expected from the names of their authors, the reports form complete and well-balanced accounts of the different aspects of the condition, and as such will be invaluable as works of reference. It must be acknowledged that little light is thrown by the different authors on the ætiology of hepatic cirrhosis, and it is clear that most of the theories which have been put forward from time to time to explain the occurrence of the more obscure forms of the disease still remain merely theories. Even the great alcohol question remains unanswered, for Prof. Fiessinger claims that to produce cirrhosis alcohol must be taken in small quantities, in a dilute form, continuously but in not sufficient quantities to produce much intoxication. He suggests that aperitives, or wine taken on an empty stomach, exactly fulfil the necessary conditions. This conception of ætiology, however, would doom far more people to suffer from a hob-nailed liver than the clinical incidence of the condition would support. The report has been admirably edited by Prof. Askanazy.

IN DEFENCE OF MARY STUART

Sir George Turner is a fearless advocate of Mary Queen of Scots. He examines the Campbell Letters—we refer readers to this closely written narrative [1] for the story of these letters and their relation to the Casket Letters—and roundly describes them as forgotten forgeries. Further, he finds that their application to previous historic arguments throws a new light upon incidents hitherto used entirely for the detraction of a terribly maligned woman. Sir George is the first medical man, we believe, to have been attracted by the problems with which Mary's dramatic and tragic career is beset, and undoubtedly analysis from a medical point of view of Mary's health has a direct bearing on the understanding of her behaviour at certain junctures. Sir George finds her to have been an emotional hysterical subject, and gives reasons for believing that she suffered from gastric or duodenal trouble, attacks of hæmatemesis having twice jeopardised her life. Later, anæmia associated with the gastric disorder and complicated by a uric acid diathesis and rheumatism made of her a prematurely aged woman. With the allegations against Mary's moral character the author deals contemptuously. In the sixteenth century, and especially in the circles where rulers and princes moved, sudden illnesses or unexpected deaths were commonly attributed to the poisoner, especially if it should be in the interests of any religious creed or political or dynastic ambition to remove an obstacle. Mary did not escape the accusations of murder, and one example of these rumours Sir George describes as "infernal nonsense," while in respect of others he has no difficulty in showing that natural causes, then unknown, lay in all probability behind the episodes. Mary had been accused on no grounds whatever save his premature death of murdering her first husband. He was a wretched weakling by whose death she lost precedence, and the accusation is generally regarded as merely malicious. Still, it was certain to have been remembered against her when it was rumoured that she had tried to poison Darnley. Of this Sir George writes as follows:—

> "With reference to the presumed poisoning of Darnley, when he left Mary he broke into a pustular eruption all over his body; he had pains in his head and throughout his bones and he had a very bad sore-throat, and lost all his beautiful hair. This eruption was either that of small-pox or syphilis."

There is no doubt either about the acumen or the ardour with which Sir George Turner makes this addition to the controversial literature evoked by Mary's tragic life. He has used the methods of the diagnostician to arrive at the general conclusion that Mary was innocent of charges brought against her on political grounds, and was in effect sacrificed in the interests of the Protestant succession.

[1] Mary Stuart: Forgotten Forgeries. By Sir G. Turner, K.B.E., C.B. London: Rich and Cowan, Ltd. 1933. Pp. 320. 10s. 6d.

NORMAL HÆMOGLOBIN

THERE still seems to be some uncertainty about the normal level of hæmoglobin in the blood stream which is to form the basis of the scale on which we calibrate anæmias and polycythæmias. A year or two ago Dr. C. Price-Jones examined [1] 100 healthy men and 100 healthy women, obtaining his samples by pricking the skin and measuring the concentrations of hæmoglobin by a verified Haldane hæmoglobinometer. For the men he obtained a mean of 105 per cent. on the Haldane scale, with a range from 96 to 116; for women, a mean of 98 with a range of 90 to 110. These figures were higher than the level originally determined by Haldane and Lorrain-Smith, but substantially less than the normals of about 112 per cent. which had in recent years been measured by various workers in other countries, notably in America. A visit to Boston enabled him to be sure that the difference was not due to the use of different methods of measuring the hæmoglobin, and he suggested that some degree of polycythæmia was caused in the United States by chronic carbon monoxide poisoning from petrol engines. Some doubt has since been cast on his facts and inferences by Drs. C. E. Jenkins and C. S. D. Don of Salford. A series of 53 Salford males gave [2] a mean of 115 per cent., and no clear connexion could be found between the concentration of hæmoglobin and the presence of CO in the blood. It does indeed seem from the work of, for example, A. O. Gettler and M. R. Mattice,[3] that though many city dwellers who use motor transport have a certain quantity of CO in their blood, the amount of hæmoglobin so rendered useless is not enough to cause a compensatory rise of hæmoglobin from 105 to 112. In a second paper they deal with 118 males and 116 females from Lancashire and other parts of England, and by van Slyke's gasometric method obtained means which were equivalent to 115 and 100 per cent. respectively on the Haldane scale. The difference between 105 and 115 is well beyond the errors of random sampling and can be hardly due to errors of technique; as Dr. Price-Jones showed, the van Slyke and Haldane methods give almost identical results. The only explanation which seems to remain is that Dr. Price-Jones used cutaneous samples of blood and Dr. Jenkins samples drawn from veins, as did the other workers who have obtained similar high values. It is generally accepted that a free-flowing prick in the ear or finger yields arterial blood. As this is what is supplying the tissues and what is

[1] THE LANCET, 1931, ii., 1140.
[2] Jour. Hyg., 1932, xxxii., 406; 1933, xxxiii., 36.
[3] Jour. Amer. Med. Assoc., Jan. 14th, 1933, p. 92.

commonly examined in clinical hæmatology, it certainly seems desirable that the normal standard should be expressed in these terms. But curiously enough no extensive comparison of the hæmoglobin of venous and finger blood seems to have been made, so that the tentative conclusion that the former gives higher concentrations of hæmoglobin than the latter is no more than inferential. It is, too, perhaps a little difficult to believe that something like 15 or 20 per cent. of the plasma leaves the blood in its passage through the capillaries. It appears to be clear, however, that samples obtained in the two ways cannot be assumed equivalent until direct evidence to that effect is available.

THE HEALTH OF THE AMERICAN STUDENT

AN interesting article was contributed recently to the *Journal* of the Association of American Medical Colleges by Dr. E. B. Heck, the physician-in-charge of the Student Health Service, attached to Columbia University College of Physicians and Surgeons. The report is founded on figures gathered from the examination of 1124 students over a period of eight years, commencing with the results of the examination of 104 students who underwent voluntary scrutiny in 1924, since when a physical examination has been a compulsory feature of the curriculum of the College. Dr. Heck supplies no detailed analysis of the figures nor correlation of the findings or the year by year changes, so that health alterations which may have occurred during the period must be estimated by a general impression of the facts, but the messages are usually clear, the notes on the incidence of diseases being sufficiently ample for this purpose. The College draws its students mainly from urban communities. More than half of those forming material for the report have been resident at home, and of the residue a quarter are housed in dormitories—i.e., in sleeping accommodation definitely connected with the organisation of the University. The residue live in lodgings of their own choice, usually with fellow students. Fifty-nine per cent. of all the students were obtaining their meals at their places of residence, the others being dependent on the irregularities of restaurant catering. With regard to the habits of the students, taking them in the lump, one is surprised to find that regular outdoor exercise was exceptional, until it becomes clear that a considerable number live far away from the educational centre and are thus forced to spend much time in their to-and-fro journeys, having the double advantage that outdoor exercise is thereby compulsory and good sleep easier to obtain, for the group residing in the University dormitories suffer from the noise at night. The work of the residents is also interfered with by "other distractions," among which we presume must be placed the "occasional parties" alluded to, which may account for an admission on the part of 20 per cent. to the use of alcohol. But there is no evidence of undue use of alcohol or of excessive smoking. Five per cent. of the students were found to be wholly self-supporting, in other words they were carrying on occupations as wage-earners; and a further 29 per cent. of them were partially paying for their medical education by outside activities. The general health status of the student groups has been estimated by Dr. Heck through an investigation into "time lost" through sickness, when the reflection is made that here a comparison with the sickness records of the ordinary industrial group would not be fair, as the tendency of the medical student when sick would be to remain at work, while the tendency of the salaried worker would be to obtain time off. The material for verifying the correctness of the reflection exists, as a proportion of the students were wage-earners, but the collection of the figures might have been difficult. It is suggested that among the students who drop out from what are called "nervous conditions"—being "run down" and other indefinite plights—many were on the verge of examinational failure and went sick just before sitting for their tests; the condition is prettily termed by Dr. Heck "a physical expression of a lack of adjustment to prescribed routine," a definition which should commend itself to the ingenious student for use in the home circle. The general conclusion of Dr. Heck is that the work on which he is engaged is justified by its results; he is convinced that a student health service should be associated with every medical school curriculum. He does not suggest that the director of such clinical investigations would be dealing either with a physically inferior group or with a group that is particularly incompetent to look after itself, for the reverse conditions seem to obtain; but there are many errors of habit and many needless anxieties among students which could be corrected or removed by sagacious inquiry into habits and domestic background as well as physical symptoms. We can well believe that the student pursuing a very strenuous career has often been valuably helped by Dr. Heck, and incidentally the annual examination of medical students has something of a didactic value, for it is the application to the students of the procedure which they will later have to apply to others.

OSCILLOMETRY AND THE "MEAN" PRESSURE

THE importance of the "mean" blood pressure has been established in recent years. H. Vaquez and D. M. Gomez[1] have published accounts of mean pressure hypertension accompanied by normal extremes of pressure—that is to say, normal systolic and diastolic readings. They state that wide variations of the extremes of pressure are not fatal provided the mean pressure remains relatively stable, whereas changes of the latter induce, even when the extremes of pressure remain normal, a serious disturbance of the circulatory system. The instrument used by them is Pachon's oscillometer, or one of its modifications. It consists of an aneroid capsule enclosed in a rigid and airtight metal box—the box, capsule, and cuff being in communication. A pump is attached to the box by means of which the pressure in the circuit is raised and registered on an attached manometer. A compression is provided which disconnects the aneroid capsule from the main box, when the pulsations from the vessels are transferred by means of the cuff along the connecting tube to the recording needle. The pressure is first raised above the systolic reading and at this point only small deflections of the needle are seen, the result of the waves in the patent part of the artery beating against the occluded part of the vessel; then as the pressure is lowered, at the point where blood is just able to enter the compressed vessel, there is a sudden increase in the needle's deflection corresponding to the systolic pressure. The deflections increase in amplitude as the pressure is lowered to a point of greatest oscillation; this point is taken as the "mean" pressure which according to Vaquez is about 8—this figure being the height in centimetres of the greatest

[1] Presse Méd., 1931, xxxix., 789.

deflection. It is reached when the counter pressure in the armlet equals the pressure within the artery. The minimum pressure is admitted to be the most difficult reading to get with accuracy. Gomez collected 300 curves from subjects in Vaquez's clinic, and an analysis of these curves shows that there are three broad types: (*a*) where the change to the diastolic descent is abrupt and therefore easily determined; (*b*) where the change is indefinite, and therefore can only be guessed at; (*c*) where there is no change at all, but a gradual descent making reading impossible. Gomez's findings have been confirmed by C. Shellshear and C. Sippe.[2] The peculiar value of the oscillometer, as has already been pointed out by J. F. Halls Dally, is that it gives an indication not only of the arterial condition but also of the cardiac condition. Further, although it is not a means of comparison between two individuals, it is a constant, given good health, for any one person and is a delicate indication of vascular and cardiac change should it be found to vary at subsequent examinations; hence the value of being able to get photographic records As long ago as 1921 Pachon found that the oscillometric index (greatest deviation of the needle) corresponded to the "mean" pressure; this was confirmed by P. Gley and Gomez[3] by means of experiments on living animals. This mean pressure or oscillometric index has been claimed as a gauge of the functional capacity of the heart, and Vaquez, Kisthinios, and Papaioannou have recently supported this claim. This reading has been found to be the same for both sexes, to increase slightly with age, to be unchanged by exercise or digestion, but to rise whenever there is any decompensation of the heart. Since the recognition of the mean pressure a clinical condition named by the French "hypertension moyenne solitaire" (H.M.S.) has been described; the associated symptoms, if any, are mainly headache and dyspnœa on exertion. The importance of the recognition of this condition would be to make an early diagnosis possible in hypertension, before the appearance of signs and symptoms, and before there is any appreciable rise in either the systolic or diastolic pressures. At this stage the kidney function is said to be normal which suggests that in certain forms of hypertension there is no primary renal lesion, but that the raised pressure precedes the renal changes. Some cases of eclampsia show a raised mean pressure and Bailliart and Gomez[4] have found a similar condition in a number of cases of glaucoma; this confirms a view long held by Vaquez that the absence of altered blood pressure in this class of case has been due to the lack of adequate means for detecting its presence. If the mean pressure is as constant and as easy of estimation as many observers claim, and if, on the contrary, the diastolic reading on any instrument is a very variable and unreliable figure, it would seem desirable to make a routine examination of the mean pressure, particularly if it makes possible an early diagnosis in a group of important diseases. C. Lian and C. Zamfir,[5] however, consider that H.M.S. is a rare condition, more in the nature of a clinical curiosity, and an examination they undertook on seven cases of glaucoma failed to reveal a single example. They stress, however, the constant character of the measure between the median and minimum pressures as compared with the variation between the maximum and minimum pressures in any individual case and they endorse the view that the variation between the maximum and mean figures is more accurate a reading because of the difficulty in obtaining a precise reading of the minimum pressure. The natural conclusion, as already suggested, would be to substitute the exact method of measuring the mean pressure for the uncertain estimation of the minimum pressure. More investigations will certainly be essential before oscillometry becomes generally adopted as a routine examination; that such work is being done is shown by the detailed account given by L. Blavier[6] of research on certain anomalies of the oscillogram and their interpretation. There is still a wide divergence of opinion about the normal figure for the mean pressure; Lian considers that 8 for the mean pressure is pathological hypotension, whereas Vaquez accepts it as normal and says that the figure may vary from 8 to 12 c.cm. between the ages of 10 to 50 years. In some oscillometric curves a plateau is present which makes it impossible to detect any highest point; recently, however, Vaquez, Gomez, and Lajoie have demonstrated that by using a large cuff—15 cm.—the plateau can be obviated, and that the correct reading proved to be as much as 10 to 20 mm. above or below the centre of the plateau. When an instrument is constructed which is generally accepted as reliable, oscillometry may become widely used for estimating the blood pressure, and the significance and importance of the mean pressure will be generally recognised.

[2] Med. Jour. of Australia, 1932, xix., 412.
[3] Jour. de Physiol. et de Path. génér., 1931, xxix., 38.
[4] Bull. de l'Acad. de Méd. Paris, 1931, cv., 510.
[5] Presse Méd., Feb. 1st, 1933, p. 169.
[6] Revue Belge des Sciences Méd., 1932, iv., 559.

EXPERIMENTAL CARCINOGENESIS

BREEDING experiments with mice carried on over a number of years at the Institut du Radium in Paris by Madame Dobrovolskaia-Zawadskaia have resulted in the production of strains of mice with a very high incidence of spontaneous tumours. Among the males spontaneous tumours appear no more frequently than in the males of the ordinary stock, but among the females mammary carcinomata are unusually common. This idiosyncrasy stimulated curiosity as to what would happen if the formation of mammary tissue could be induced in males, and particularly in males of a cancer strain. L. Loeb and others tried to answer this question by transplanting ovaries into castrated males, but failed to observe the development of mammary carcinomas. A. Lacassagne[7] injected folliculin daily into castrated adult males, again with negative results. But when very young males —10 to 18 days old—from a cancer strain were taken and injected daily with small doses of folliculin, small islets of mammary tissue developed and these became the seat of carcinomata. The injections were carried out with a litter of three males and two females; all three male animals developed mammary carcinomata, the first tumour appearing about five months after the onset of treatment. One of the females also developed a mammary carcinoma at the age of 4 months. This is exceptionally early, since even in a cancer strain spontaneous tumours never appear before the sixth month, and the average age at which they develop is about 1 year. Curiously enough the other female is still alive, but, in spite of the injections, has not yet developed a malignant growth. Further experiments will have to decide whether the folliculin acted indirectly in inducing the appearance in the males of mammary tissue, which then, owing to the hereditary predisposition latent in the strain, developed malignancy; or whether the folliculin had in addition a more direct exciting action in producing malignancy. Dr. Lacassagne has also been successful in producing

[7] Comptes rend. de l'Acad. des Sciences, 1932, cxcv., 630.

malignancy by an entirely different route. Three years ago he showed with Dr. R. Vinzent [8] that by a single irradiation of an abscess produced in rabbits by the injection of *Streptobacillus cavia* sarcomata were produced in three animals out of twelve. The tumours represented three different histological types: an osteosarcoma, a fibrosarcoma, and a rhabdomyosarcoma. No tumour developed in rabbits which had received injections of the streptobacillus but had not been irradiated. It appeared from these experiments that the development of malignancy was the result of the combined action of the micro-organisms and the irradiation. Quite recently, however, Dr. Lacassagne [9] has been able to obtain similar results by irradiating a sterile granuloma produced in rabbits by the injection of kieselguhr. The kieselguhr was injected under the mammary gland on the right and left side, and only one side was irradiated. In two rabbits malignancy developed on the irradiated side, one tumour being a carcinoma and the other a sarcoma.

SAFETY IN CHILDBIRTH

AMONG the changes which have been taking place in obstetric practice during this century one of the most important is the increasing use of hospitals for delivery. Both in Europe and in America new institutions have been built and existing ones have been enlarged to accommodate more cases of both normal and abnormal labour. In a recent paper J. B. DeLee and H. Siedentopf [10] discuss whether these recent changes in the practice of obstetrics have resulted in better welfare of mother and child, less loss of life, greater protection of health. They come to the depressing conclusion that the increasing preference of the hospital as a place of delivery seems not only not to have bettered the results but seems actually to have made them worse. In support of this conclusion they cite the Aberdeen report by Parlane Kinloch, J. Smith, and J. A. Stephen,[11] and a report from New York City, to show that "there is a serious risk in the usual maternity ward which is absent in the usual confinement at home." In the Aberdeen report the high institutional death-rate is ascribed to the influence of "gross contagion," but the British Maternal Mortality Committee thought that this analysis of conditions should not be assumed to apply to the whole country because the available evidence suggested a different conclusion. They found that the majority of deaths from puerperal sepsis do not occur in epidemics but in single or sporadic cases; nevertheless they recognised the danger of outbreaks of infection, and agreed that the aggregation of maternity cases is by no means free from risk. DeLee and Siedentopf quote reports of 38 epidemics of puerperal infection, of which 35 occurred in the maternity wards of general hospitals. They ascribe a large part of the high institutional mortality to the spread of infection among puerperal patients, to contagion by carriers, and to the presence of gynæcological, surgical, and medical patients in the same building; and they therefore recommend isolation of the clean maternity patients in separate buildings with separate nursing and domestic staff. Fewer outbreaks of infection have been reported in this country than in America, but the danger is a real one, and this recommendation should be borne in mind whenever new hospitals are to be built. The most careful and expert nursing cannot prevent the occasional transport of organisms, and the fact that epidemics of wound infection have been known to occur in clean surgical cases shows that their proximity to obstetric cases may be dangerous.

Ease of intervention and a false sense of security in hospital have contributed to the increase in the number of artificial deliveries, which bring with them an increased mortality risk. Premature and unnecessary intervention have also been alleged as a reason why maternal mortality is higher in the practice of doctors than in the practice of midwives, though this difference must be partly due to the great preponderance of normal cases in midwives' practice. Bethel Solomons [12] holds strong views about the high maternal death-rate in private medical practice. From his experience as Master of the Rotunda he has found reason to ascribe many deaths either to "wilful negligence or abysmal ignorance" on the part of the attendant. Without in any way subscribing to such a damning indictment, it is possible to agree that the practitioner should receive a better obstetric training than has hitherto been available in most medical schools. Bethel Solomons holds that a compulsory period of three to six months' residence in a maternity hospital should be insisted on before a doctor should be allowed to practise. This would raise issues far beyond obstetrics, but need hardly be discussed at present because there are certainly not enough hospital positions available to make it practical politics. Solomons lays stress on good aseptic technique. Infection with organisms carried in the throats of the attendants is not regarded by Solomons as of any importance; he lays stress on the teaching of good aseptic technique. DeLee is a believer in droplet infection, which has been definitely proved in certain epidemics, and he also suggests the possibility of air-borne infection. These communications from Ireland and America are really complementary; the one emphasises the danger of hospital delivery, the other the importance of improved training for the student and post-graduate instruction for the doctor and the midwife in order to improve the standard of private practice. It is clear that a substantial decrease in maternal mortality and morbidity can only be expected if a combined attack is made from many angles.

RAPID DIGITALISATION

BY digitalisation is meant the attainment of the maximum therapeutic effect of digitalis or strophanthin. Auricular fibrillation is, of course, the condition in which the drug exerts the most spectacular effects, and the one in which the efficacy of any special method of administration can best be judged. Dr. Elsie Porter reports [13] the results of giving in a single dose, by various routes, a quantity of digitalis or strophanthin calculated to produce full digitalisation. The estimation of this dose is still a difficult matter, particularly as full therapeutic and toxic effects are not far apart. The investigation was made on cases of auricular fibrillation with rapid heart-rates, to whom no digitalis had been given for three weeks. The drug was given in a single dose by mouth in an amount corresponding to 0·125 c.cm. of tincture (international standard) per lb. of body-weight. Within eight hours the ventricular rate was slowed in nearly all cases, about 40 or 50 beats per minute (the rates being calculated from electrocardiograms). In cases where congestive failure might lead to vomiting the rectal method of administration was used, similar results being obtained with a dosage of 0·1 c.cm. of tincture per lb. body-weight. A third

[8] Compt. rend. Soc. de Biol., 1929, c., 249.
[9] Comptes rend. de l'Acad. des Sciences, 1933, cxcvi., 69.
[10] Jour. Amer. Med. Assoc., 1933, c., 6.
[11] See THE LANCET, 1929, i., 85.
[12] Medical Forum, January–February, 1933, p. 89.
[13] Quart. Jour. Med., January, 1933, p. 33.

group was treated with intravenous strophanthin. Initial experiments with a dose of gr. 1/100, which would generally be considered quite a high one, showed no slowing of the heart-rate. Finally, a dose of gr. 1/33 was found usually to produce an adequate slowing within half an hour, any larger dose leading to toxic symptoms. The method appears to be a safe one when no digitalis has been given for two or three weeks, except under two conditions: if the patient is subject to paroxysmal fibrillation with high ventricular rates, and if cardiographic changes indicate considerable myocardial damage. Experiments made on the ability of atropine to abolish the slowing of the heart-beat produced by digitalis and strophanthin showed that these drugs act largely or entirely on the vagus.

FRACTURES OF THE NECK OF THE FEMUR

FRACTURES of the neck of the femur have an unfortunate tendency not to unite after the manner of most other fractures. Nowhere else in the body, excepting perhaps in the scaphoid bone of the carpus, is there anything like the same incidence of non-union. Dr. W. Eugene Wolcott, in a discussion at the 83rd annual congress of the American Medical Association in New Orleans, stated that in a series of 41 cases, all treated by the Whitman method of fixed abduction in plaster, 15 remained ununited. Subsequent speakers at the congress, while considering this figure unusually high, agreed that the average incidence of non-union was high enough to give rise to grave dissatisfaction. There have been various speculations and assertions about the causes of this failure to unite. The favourite teaching has been that the cause is primarily vascular. The blood-supply to the femoral epiphysis is said to be poor and, being damaged at the time of the injury, is no longer able to keep the head of the bone alive. The blood-supply to the head and neck of the femur reaches it by two routes—through the ligamentum teres and along the retinacula of the neck. The neck of the femur is anatomically a part of the shaft; its blood-supply is therefore carried to it by the periosteum. The vessels lie along the retinacula, give branches to the neck, and then, entering foramina at the junction of head and neck, are the main supply to the head. They are of considerably greater importance than the vessels entering along the ligamentum teres, which supply only the "core" of the head. Dr. Wolcott is investigating by injection methods, using fluid opaque to X rays, the anatomical connexions of these vessels. He has traced branches from the obturator and the internal circumflex arteries into the ligamentum teres, but has not had much success with the vessels of the neck. No anastomosis between the two sets of arteries has so far been demonstrated by him. By direct observation of four cases of non-union subjected eventually to open reconstruction operation by the Whitman method, Dr. Wolcott was able to show that the ligamentum teres had vessels of a respectable size, quite patent and spurting when cut across. Dr. Myron O. Henry, in the same discussion, pointed out that the course of the decalcification of the femoral head demonstrates the presence of an active circulation. Less seems to be known about the fate of the vessels in the retinacula in these injuries, although it is by no means certain that their blockage or severance would of necessity interfere with union.

Apart from vascular failure, non-union has at various times been attributed to lack of sufficient hæmorrhage at the site of the fracture, to prolapse of the capsule between the bone ends, and to the action of the synovial fluid. Prolapse of the capsule was looked for by Dr. Wolcott. He did not find it in any of the four cases on which operation was performed; what he did find in all of them was a growth of fibrous tissue over the end of the femoral neck on the distal side of the fracture. This fibrous tissue had a fairly good blood-supply and bled when incised; its presence in one case and not in another may be of the utmost importance in determining whether union will take place.

In attempting to assess the influence of the form of treatment on the occurrence of non-union, it is of interest to note Dr. Wolcott's view that only 35 of his 41 cases were *efficiently* treated by Whitman plasters. Accurate reduction and immediate and prolonged fixation in extension may have an important bearing on the occurrence of union, despite the fact that callus formation in fractures of the *shaft* of the femur occurs quite readily without accurate and complete reduction. The Whitman method of reduction and retention in plaster is probably the commonest form of treatment at present in use for fractures of the neck of the femur. It would appear from the opinion expressed by American orthopædic surgeons that its success is far from certain. Dr. Frederick Gaenslen made a useful suggestion. He has found that a position of slight valgus at the fracture favours a more rapid union. By practice on artificially produced fractures in the cadaver, Dr. Gaenslen has evolved a method of producing this position during reduction. He first flexes the hip-joint and knee-joint to 90°, and then uses upward traction in the line of the femur to reduce the fracture. Manual thrust in the region of the great trochanter produces the valgus deformity. The limb is finally brought into extension with a moderate degree of abduction and internal rotation. The question arises as to whether it is an impaction produced by the method which results in the success claimed for it, or some mechanical advantage in the position to the vessels running along the neck. Some surgeons, believing in the importance of an initial hæmatoma, inject blood to the site of fracture. It is obvious that the process of union and also of the formation of false joints in fractures of the neck of the femur still provides a field rich in problems.

EPSOM COLLEGE

A SHORT time ago the Epsom College Act of 1932 was passed extending the benefits of the Royal Medical Foundation of the College to medical women pari passu with medical men. The Council has now asked medical women to take up administrative responsibilities—namely, Dr. Laetitia Hutchison (Mrs. Robertson Hutchison) as a member of the Council, and Dr. Christine Murrell as the representative of the Medical Women's Federation on the Conjoint Committee of the College, which now elects the Pensioners and Foundationers. The Council of the College has acted promptly under its new opportunities, and will surely reap advantages, academic and material, from the course of action taken.

Sir Charles Sherrington will deliver the Rede lecture, entitled Mechanism and the Brain, in the Arts School at Cambridge on Wednesday, May 24th, at 5 P.M.

THE Lister memorial lecture of the Royal College of Surgeons of England will be delivered in the theatre of the College by Sir Charles Ballance on Wednesday, April 5th, at 5 o'clock.

WE regret to record the sudden death at Cambridge on Monday last of Mr. Arthur Cooke, senior surgeon and ophthalmological surgeon to Addenbrooke's Hospital.

SPECIAL ARTICLES

FOOD AND HEALTH

THE PHYSIOLOGICAL MINIMUM

THE public conscience is becoming more and more disturbed about the distress which is accompanying prolonged and widespread unemployment. In this country insurance benefit has largely prevented physical suffering, and it is generally agreed that minds have taken more harm than bodies. Indeed, various medical officers of health have given their opinion that there is no conspicuous increase of malnutrition in the areas under their charge, and it is stated that the fall in the cost of living has been so great as to compensate for reduction in unemployment benefit. On the other hand it is urged that a weekly dole which will support a man or family in reasonable comfort for a few months is not necessarily adequate as a sole source of livelihood over many years. And repeated statements that it is unreasonable to ask the unemployed worker to keep a wife and children on the allowances now paid have led people to ask exactly what supplies, apart from shelter and clothing, are required for maintenance of health.

During the past few years we have reviewed or published many reports which provide a partial answer to this question, and we think it will be useful to recall them now by summarising some of the information they contained.

What must the Diet include?

Many of the main facts about good and bad diets were set out by the Ministry of Health's Advisory Committee on Nutrition a year ago.[1] For practical purposes, the committee say, one has to judge a diet in four different respects—namely, the supply of calories (units of energy), the quantity of "first-class" protein, the supply of mineral matter, and the vitamin-content.

Calories.—The calorie needs of the adult male may be taken as 3000 (great) calories per day. The needs of women and children can conveniently be expressed as decimals of the adult man's needs, and the following is the scale used by E. P. Cathcart and A. M. T. Murray in a recent report to the Medical Research Council (Table I.).

TABLE I

	Calories	Man Value		Calories	Man Value
Adult woman ..	2500	0·83	Child 6–8	1800	0·60
Boy of 14 or over	3000	1·00	,, 3–6	1500	0·50
Girl ,, ,,	2500	0·83	,, 2–3	1200	0·40
Child 12–14 ..	2700	0·90	,, 1–2	900	0·30
,, 10–12 ..	2400	0·80	,, 0–1	600	0·20
,, 8–10 ..	2100	0·70			

(The calorie needs of persons over 65 years of age may be taken as 2250 per day or a "man value" of 0·75.)

These figures are described as "not very generous."

It is also usual to calculate the distribution of the calories between protein, fat, and carbohydrate.

Each gramme of protein, when burnt in the body, yields 4·1 calories, each gramme of fat 9·3, and each gramme of carbohydrate 4·1. In temperate climates the range for protein is from 10 to 15 per cent. of the total calories in the diet; for fat, from 20 to 35 per cent.; and for carbohydrates 50 to 70 per cent. (If the fat is high the carbohydrate is usually low, and vice versa.) If, say the committee, the absolute amounts of protein and fat fall much below 80 and 50 g. respectively per day (per "man"), or the percentage of calories derived from carbohydrates rises much above 66, the diet may be considered to be in need of improvement.

First-class protein.—"The next criterion is that of the supply of first-class protein. Some proteins replace a greater amount of protein lost to the body by wear and tear than others, and are also more adequate for the purposes of growth. Those which are most efficient in these respects are termed first-class proteins, or proteins of high biological value. First-class protein (for practical dietetics) is to be found only in animal protein, such as that in cheese, eggs, fish, meat, and milk. The amount of first-class protein per 'man' necessary per day can be expressed either in absolute amount or as yielding a definite percentage of the total calories. The absolute amount is about 37 grammes and the percentage conten of the total calories is 5. . . (Most middle-class diets have about 55 grammes first-class protein or, in other words, about 7·5 per cent. of the total calories is supplied by first-class protein. Working-class diets frequently fall below the standard.) Any deficit of first-class protein is probably detrimental, for the figure adopted as a standard is not high."

Mineral matter and vitamins.—The remaining criteria can be considered together. Unfortunately, there are as yet no quantitative data of the amounts of the different vitamins essential to the human diet. On the other hand, the foods which are useful in supplying mineral matter are often useful in supplying vitamins. These "protective foods" which prevent deficiency diseases are milk and milk products, fresh salad vegetables and fruits, liver (and liver oils), fish (especially the fat fish and fish roes), and eggs. It will be seen, the committee remark, that if a diet contains milk (and dairy products generally), fish, eggs, and fresh salad vegetables, there is little need to criticise it as regards its mineral and vitamin-content.

"Probably if the diet contains per person 1 pint of milk per day, if cheese is partaken of freely, if one orange or one tomato or a helping of raw salad is taken daily, if 1 oz. per day of butter (or of vitaminised margarine) is given, and if some sort of fat fish, such as herring, appears in the winter menu once a week (or if in default of such fish half a teaspoonful of cod-liver oil is taken once a day) the mineral matter and the vitamin content of the diet are satisfactory."

Conclusion.—It is perhaps essential in conclusion to emphasise the fact that the diet must satisfy all the criteria. If it is not complete as regards calories, first-class protein, mineral matter, and vitamins, it is to be condemned. No amount of calories will make up for any other deficiency, and no amount of vitamins or mineral matter can make up for a deficiency in calories or of first-class protein. A diet must stand four-square upon calories, first-class protein, mineral matter, and vitamins.

Common Faults of Diet

With the enormous range of foodstuffs procurable in Great Britain (the memorandum goes on) no person and no institution with money to spend need have a defective diet. But where economy is to be considered it is otherwise. Defective diets are often the result of an unscientific economy. First-class protein and the protective foods are costly, or at any rate are accounted expensive.

Calories.—Most institutions if not most individuals have discovered what are the foods which are extremely cheap sources of calories. They are flour, oatmeal, bread, the pulses, dripping, margarine, treacle, sugar, and, not far behind, butter, cheese, jam, bacon, and dried fruits. Sometimes, however, the proportion of fat is too low.

[1] The Criticism and Improvement of Diets. H.M. Stationery Office. 1932. 3*d*. See THE LANCET, 1932, i., 782.

First-class protein.—"It is not often that the diet of an institution is found to be deficient in first-class protein, but the individual's diet frequently is so. Though this latter is sometimes the result of individual taste, it is usually due to economy. . . Where economy must be considered, the use of cheese, herring, fish roe, and sprats is advisable, and fortunately none of these needs much cooking. Other reasonable sources of first-class protein are cod, milk, ox liver, imported beef, and rabbit. If skimmed milk is obtainable, the first-class protein ration can be obtained as cheaply as with fish roe."

The protective foods.—"It is in the protective foods that deficiency is likely to be met. And first upon the list of protective foods comes milk. It is generally agreed that one pint of milk per head per day is advisable, though the milk consumption in this country does not reach half that figure. The value of milk in a diet is now generally recognised. (Apart from its value as a protective food, milk is not dear for calorie value—i.e., 10*d.* per 1000 calories—nor for its protein ration, 6*d.*–7*d.*) Skimmed milk, where obtainable, is very valuable as a cheap protective food . . . ."

"The question is bound to arise whether *butter* or *margarine* be employed as one of the sources of fat. Economy suggests margarine. There is the possibility that butter may be devoid of vitamin D in winter and, consequently, if butter is being relied upon as a protective food it would be best to specify butter such as New Zealand butter, which is fairly constant in its vitamin D content. Margarine can be obtained which contains vitamins A and D, and if margarine is used such a product should be specified . . . ."

"Finally, it may be found that a diet is deficient in vegetables, or that the latter are limited merely to potatoes and 'greens.' . . In England and Wales there is little excuse for this, for there is an abundant and cheap supply of tomatoes, celery, hardy lettuce, endive and watercress in the autumn and winter. Indeed, watercress is abundant most months of the year, and relatively cheap. A regular and varied supply of these foods, not necessarily in large quantities, should be used to improve a diet deficient in the vegetable type of protective foods. Other additions which it would be wise to make are carrots (valuable as a source of vitamin A), and oranges and lemons, which are a source of the antiscorbutic vitamin."

Minimal Cost of a Sufficient Diet

Various attempts have been made to estimate the minimal cost of a sufficient diet, and two of these have appeared in our columns comparatively recently.

V. H. Mottram[2] prefaces his calculations by pointing out that the lowest conceivable diet upon which subsistence with efficiency is possible, consists of 7¼ oz. of fresh herrings, 1 lb. 7 oz. of oatmeal, and 4 oz. of cabbage—at a cost (in 1927) of about 6*d.* per day. But of course, he says, such a subsistence diet is impossible.

"No one could swallow 1¼ lb. of oatmeal a day, nor tolerate the monotony of the diet, even supposing he had the physiological knowledge to purchase such a diet and the practical knowledge of how to cook and serve it so that it were not revolting. One thing which has become abundantly clear in physiological research is that appetite, as apart from hunger, has much to do with the proper digestion, assimilation, and utilisation of food. The physiological engines of the body are guided partly by the psychological condition of their owner. Consequently no subsistence diet, however admirable from the theoretical point of view, such as the one given, can be accepted as practical."

Starting from the basis that the diet must be varied and palatable and not depart markedly from what is acceptable to a working-class community, Mottram came to the conclusion that "with skilful purchasing in the cheapest market, based either on a long experience or on a knowledge of dietetics, a dietary can be obtained at so low a cost as 6*s.* 3*d.* per week per adult male, so long as the occupation followed is not a very strenuous one. Below such an expenditure, he said, it is unlikely that bodily efficiency could be purchased.

"This sum, therefore, sets the limit from which we may proceed to estimate what minimal subsistence will cost. It must be realised, however: (1) that this figure was arrived at when food prices were low, and that any attempt to put it into practice must allow for fluctuations in the prices of foods; and (2) that it demands skill in laying out of money which only one or two housewives in a hundred appear to have. Although this figure is used throughout the rest of the discussion, my own prejudice is in favour of raising it to 7*s.* per week."

Accepting 7*s.* per week per man as Mottram's final estimate, it needs correction in accordance with the fall in the cost of living. In 1927 the cost of food was estimated at 61 per cent. above pre-war values, whereas in February, 1933, it is only 22 per cent. higher. With a corresponding reduction, Mottram's 7*s.* thus becomes about 5*s.* 4*d.*

G. P. Crowden,[3] about a year ago, also reached 7*s.* as the physiological minimum basis per man-value per week. His calculations presuppose, he says, "the most economic purchasing and household management by the mother in the family—an assumption which is rarely justified," and they were made on the basis of a list of foodstuffs compiled by the North Islington welfare centre in July, 1929. This gave a man-value of 8*s.* 2½*d.*, which Crowden corrected to 7*s.* because the cost of living had fallen; and it must be further corrected to about 6*s.* 8½*d.* at present prices.*

Somerville Hastings[4] quotes Caradog Jones's estimate of 6*s.* 3*d.* per week (1931).

Finally, we may refer to G. C. M. M'Gonigle, whose paper was summarised in our issue of March 4th (p. 471). His figure is the lowest, for he believes that in the spring of last year, in the markets of Stockton-on-Tees, is was possible to buy enough food for 5*s.* per "man"; and corrected to fit the further fall in the cost of food this comes to about 4*s.* 10*d.* The estimates may now be summarised as follows (Table II.).

TABLE II.—*Estimated Cost of Subsistence Diets per "Man" per Week*

	Estimate		Corrected to February, 1933	
	s.	*d.*		*s.* *d.*
Mottram (1927)	7	0	....	5 4
Crowden (1932)	7	0	....	6 8
Caradog Jones (1931)	6	3	....	? 5 10
M'Gonigle (1932)	5	0	....	4 10

In considering these figures it must be borne in mind that the Ministry of Labour's estimates of the rise and fall in the price of foodstuffs are only a rough generalisation. Further, as Mottram says, some modicum of variety is essential. "Psychology invades the problem, for man is no Robot, whom you can stoke with the same monotonous fare day after day."

The Feeding of Children

The problems of the family can also be looked at in the light of institutional experience. The Advisory

[2] THE LANCET, 1927, ii., 898.

[3] Ibid., 1932, i., 899.

[4] Ibid., 1932, ii., 1185.

* Crowden's diet gives 3570 calories per day. In commenting on this and other estimates (*Week-end Review*, March 4th) Mottram says: "Clearly 5*s.* per week per adult male is a figure below which it is not safe to go if the food is bought retail, and the natural assumption is that if 7*s.* supply some 11 per cent. too many calories and 5*s.* some 10 per cent too few, the sanest figure to adopt for practical purposes is 6*s.* per week per adult male."

Committee on Nutrition [5] have inquired into the diets offered in children's homes maintained by poor-law authorities, and have made recommendations about their improvement.

"In homes visited in the North of England," they say, "the average weekly cost of food per child was said to be 3*s*. 11½*d*. in the case of certain scattered homes containing 341 children; 4*s*. 8*d*. in certain grouped cottage homes containing 260 children; and 5*s*. in other grouped cottage homes containing 550 children. In each case most of the food was obtained from stores at contract prices. It is interesting to note that the cost of food per head in these homes exceeded that in homes visited in the south (so far as we could ascertain), notwithstanding that on the whole prices seemed lower than in London and the home counties. The additional cost was reflected in the better standard of feeding in the northern homes."

The weekly cost per head of the meals which they suggest in an appendix to their memorandum would vary according to the locality of the home, the number of children in it, and the conditions under which the foodstuffs are purchased. "In a home containing about 200 children we estimate that the weekly cost, allowing 1 pint of milk per child daily, would be about 4*s*. 6½*d*. per head if all provisions were bought at contract prices." (This report is dated November, 1931, and correction for the fall in the cost of foodstuffs would bring this figure down to 4*s*. 3*d*.). Sir George Newman [6] thinks that unless the numbers are large and there are facilities for obtaining foods at contract rates, it may be assumed that 5*s*. 6*d*. per head weekly is a reasonable price to pay. "In schools for delicate children" he adds, "there is, however, a good deal to be said in favour of increasing the milk ration to 1½ pints daily (in which case the supply of meat and fish may suitably be reduced) and of substituting butter for margarine. This will probably raise the cost to approximately 6*s*. per week."

In 1927, after studying the dietaries given by a large number of poor-law authorities, the National Association for the Prevention of Infant Mortality gave the following as the basis of a suitable dietary for children between the ages of 1 and 5 years.[7]

Daily.—One pint of milk, the juice of orange, tomato, grape or lemon. An apple, orange, tomato; some salad or lemon juice (for older children). Two to four ounces of meat or fish, or one egg. Cod-liver oil if the butter ration is reduced.

Weekly.—Two to four ounces of butter. Two eggs.

Milk in London costs about 3*d*. a pint or 3½*d*. in the winter. Seven pints cost 1*s*. 9*d*. or 2*s*. 0½*d*.

High Rents and Insufficiency of Food

Food is only one of the necessities of life, and the amount of money available for it depends on the cost of the others. Mottram guesses that 60 per cent. of the income of a person at subsistence level should go towards nourishment, but it is clear that circumstances may decide otherwise. Thus it might be shown that a reasonable average rate of wages or unemployment benefit proved totally insufficient to maintain the health of particular families because, for example, the rent paid was higher than it should be.

It is not our object here to examine the general adequacy of the sums now paid weekly to working-class families in or out of employment; but it is sufficient to demonstrate that there is a problem to be faced. Two or three quotations will suffice for this purpose.

Crowden gives a few examples of family budgets collected in London showing physiologically inadequate expenditure on food; and without drawing conclusions from his insufficient data he notes in passing that on the average the amount spent on rent was about 35 per cent. of the total weekly income, or twice the percentage of 17 on which the Ministry of Labour bases its present calculation of the cost of living index.

"If a family undertakes such a fixed weekly commitment as rent," he says, "and then finds by bitter experience that insufficient money is left for the provision of adequate food . . . it is inevitable that debt or breakdown in health, or both will follow. . . . Whatever may be the urgency for housing undertakings paying their way, it is bad business from the national health point of view if such can only be achieved at the expense of family health."

M'Gonigle, in the course of his investigation of the standard of living in two parts of Stockton, analyses the weekly budgets of 22 unemployed families who had moved to a new housing area. Their mean income was £1 10*s*. 5*d*. a week, of which 31·3 per cent. (9*s*. 6*d*.) went in rent, 29·3 per cent. in "other necessary expenditure" (including clothing, clubs, and insurance), and 36·7 per cent. in food. The mean "man value" of each family was 3·8, and the amount spent in food per "man" per week was 2*s*. 10½d. The diets thus obtained were compared with a "normal" diet, as follows:—

Normal diet.	Unemployed families. Quantities	% of normal*
First-class protein (37 g.)	22·78 g.	55·4
Total protein (100 g.)	65·79 g.	59·2
Fats (100 g.)	73·72 g.	66·3
Carbohydrates (400 g.)	419·0 g.	94
Calories (3000)	2696	80

* 10 per cent. is deducted for wastage.

It will be noted that the calorie value per "man" in these families was 2696; whereas five employed families on the same estate gave an average figure of 4277. M'Gonigle, calculating that a "normal" diet could be obtained (last spring) at 5*s*. per "man," says that a family consisting of man, wife, and three children, aged 8, 10, and 12 years, ought to spend £1 1*s*. 6*d*. on food. The income of such a family, if unemployed, would be £1 9*s*. 3*d*. The sum of 7*s*. 9*d*. would thus be left for other purposes.

Cathcart and Murray found eight families in Cardiff and twelve in Reading in which the mean calorie value was less than 2500, and three in which it was less than 1800. This shortness of food was not attributed solely to the smallness of the income, but partly to incapacity or improvidence. They came to the conclusion, however, that with very restricted incomes a distinctly smaller proportion of the weekly wages is devoted to the buying of food in these English towns than in Scottish towns—largely because of the higher rents in the south.

Somerville Hastings quotes the annual report of the medical officer of health for Hammersmith (1931), who "examines the budgets of a good many working-class families, both employed and unemployed, and finds that when rents are paid there is in many cases a very small surplus left to provide food, clothing, and other necessities of life. Amongst the unemployed this may be, according to his statements, as little as 2*s*. 8*d*., 2*s*. 4*d*., 1*s*. 11*d*., or even 1*s*. 7*d*. per head, and amongst the employed may come down as low as 3*s*. 8*d*. or 2*s*. 9*d*." Hastings points out that townspeople with large families are often compelled to pay relatively large sums for accommodation because owners and agents refuse to let rooms to people with children.

We note that the *Week-end Review* (March 11th, p. 264) has formed a small committee which is to make a statement on the minimum standard of maintenance necessary in food, heat, and shelter.

[5] Diets in Poor-law Children's Homes. H.M. Stationery Office. 1932. 3*d*. See THE LANCET, 1932, ii., 782.

[6] Annual report of the chief medical officer to the Board of Education for 1931. H.M. Stationery Office. 1932. 2*s*. 6*d*. See THE LANCET, 1932, ii., 1282.

[7] See THE LANCET, 1927, i., 110.

This committee includes an economist, a physiologist, a housewife, a doctor, and a social worker, and it is asked to report by the end of this month.

MEDICINE AND THE LAW

"Misadventure by Narcotic Drugs"

THE inquest on Mrs. Beech, begun at Paddington on Feb. 17th and adjourned to Feb. 28th for an analysis of certain organs, was concluded by Mr. Ingleby Oddie on March 1st. The coroner reached his decision without a jury and recorded a verdict that death was due to misadventure by narcotic drugs. As will be seen, the suggestion of suicide was negatived and there was no evidence of criminal negligence in medical treatment; there was however a prolonged inquiry into the effect of various narcotics; this disclosed a sharp difference between the opinions of Home Office experts and the practice of clinicians especially in respect of the use of nembutal.

Mrs. Beech, aged 34, died on Feb. 13th. She had come to London on her way abroad. Being taken ill on Wednesday, Feb. 8th, she went to see her medical attendant, Dr. C. H. Atkinson, complaining of nerves, insomnia, and colic. He had first attended her in April, 1931, before which date she had been taking omnopon; the dosage of this drug was reduced and she came off it in about three weeks. He next saw her on Dec. 26th, 1931, when she had been taking alcohol and had gastric trouble as well; she had been taking paraldehyde 2½ drachms at night and was also having gastric treatment. Dr. Atkinson was informed subsequently of other drugs being taken. In October, 1932, she came again under his treatment; there was investigation and treatment for duodenal ulcer. Her own doctor had been giving her luminal (substituting somnifain later) and paraldehyde, but by this time the dosage was greatly reduced. The drugs were given because of her mental condition; he was particularly anxious not to give her morphia. On Feb. 8th she was very excitable and he gave her 3 drachms of paraldehyde and 5 grains of medinal. On the Thursday he gave another 3 drachms of paraldehyde. On Friday she told him she had taken 4 ounces of sal volatile in two portions somewhat diluted. He thereupon called in Dr. R. D. Gillespie, who inquired fully into the history of the case and the details of drugs taken. Mrs. Beech, according to Dr. Atkinson, was neither a drug nor an alcohol addict, but, during periods of mental upset, she would take drugs and drink sal volatile or even scent. Dr. Gillespie gave her 3 drachms of paraldehyde followed by two further doses of 2 drachms each. On the Saturday morning she was not much better; he then gave her more paraldehyde and another dose again at night, administering in addition 4½ grains of nembutal. She had not taken nembutal before; he prescribed it to reduce the need of a large quantity of paraldehyde. Mrs. Beech was then moved to a nursing-home where she had three nurses and was constantly watched. That night she was restless and excited under the influence of the two drugs. Very early on Sunday she was given 7½ grains of medinal, then 3 drachms of paraldehyde, followed by a further 2 drachms of the same in the afternoon. At 9.15 P.M. she had 6 grains of nembutal; during the day she had 60 grains of potassium bromide in three 20-grain doses. On Monday, after further doses, she had six hours' sleep and awoke apparently quite bright. She talked, read, brushed her hair, attended to her nails, and spoke of her forthcoming visit to Paris. She was still restless and tried to sleep but failed. She was then given 7½ grains of medinal and gradually lapsed into unconsciousness from which she never recovered, death occurring at 3.30 P.M. Post-mortem examination, according to Sir Bernard Spilsbury's report, disclosed no cause of natural death.

The coroner ordered an analysis, and this, undertaken by Dr. G. Roche Lynch, showed 1 grain of nembutal in the liver and ⅛ grain in the kidneys; there was a smell of paraldehyde in the body, but no trace of medinal. Dr. Roche Lynch believed death to be mainly due to the use of medinal and nembutal; the use of potassium bromide and paraldehyde were to some extent contributory; he thought some of the doses were heavy; he could not exclude the damaging effect of the dose of sal volatile. Sir Bernard Spilsbury, having heard this evidence, agreed. He said he could not entirely exclude the effects of the sal volatile; though it had been taken some days earlier, there were still signs of its injury to the mucous membrane of the œsophagus, stomach, and duodenum. It had caused irritation to the stomach, accounting for the patient's restlessness.

THE CORONER'S VIEW OF THE EVIDENCE

This, said the coroner, perhaps explained why Dr. Gillespie's treatment did not produce the desired effect; paraldehyde sufficient to give six hours' sleep had produced only one hour. The sal volatile, he added, had an effect which necessitated the continued use of large doses of barbiturates. One theory, supported by Dr. J. A. Ryle, was that the ammonia in the sal volatile set up gastric uræmia which might account for death, but the coroner was unable to find characteristic history in confirmation. The coroner did not believe the sal volatile was taken with suicidal intent. The patient's doctor had told her not to take alcohol; if she felt the need of stimulants, she was advised to take sal volatile. She took an overdose to relieve her symptoms, not realising what she was doing.

Dr. Gillespie, said the coroner, believed the failure of his treatment with drugs was caused by the seriousness of the patient's mental condition; he had proceeded to give large doses and to vary the drugs, hoping that they would master the sleeplessness and excitement. "In my opinion," he continued, "the doses, though large, were not excessive; taking into consideration what his special knowledge of the patient was, and the fact that she had swallowed the sal volatile, Dr. Gillespie cannot be criticised." It was true that he was dealing with what Sir William Willcox considered a dangerous drug. Nembutal had been used very largely in similar doses without ill-effects. Once or twice there had been alarming symptoms, but no death was traceable directly to nembutal, though there were cases where nembutal might have played a part in death. It was evidently a dangerous drug and one whereof the effects should be carefully watched. Dr. Gillespie had first given 4½ grains, which the coroner considered not excessive from the evidence. He then gave 6 grains "which again I cannot say was excessive." It was reasonable to believe that, in view of the patient's better condition on the Monday morning, the effect of the drugs had passed off. In view of her condition that morning the coroner saw nothing to criticise in the 7½ grains of medinal which the nurse administered under Dr. Gillespie's orders that day. Paying a tribute to Dr. Gillespie's experience and care, Mr. Ingleby Oddie said there was no evidence of negligence and certainly there was no gross negligence. Dr.

Gillespie was entitled to rely on past experience and on his knowledge of the effect of similar doses of the drug. Mrs. Beech died from the combination of drugs she had taken, including the sal volatile.

EVIDENCE OF THE TOXICITY OF NEMBUTAL

The evidence of Sir William Willcox made clear his profound distrust of the barbituric acid group of drugs. He spoke of their toxic effect upon the brain and other organs. In his opinion death was due to the combination of all the drugs, with (as a possible contributing cause) the sal volatile. He appreciated that the patient had been accustomed to take some of these drugs, but barbituric acids do not produce tolerance as in the case of morphia. It was in his opinion utterly untrue that nembutal was a safe drug. He would prefer not to say what was a safe dose of it. The drug was only recently introduced. When veronal was first brought in, the dosage was reduced by half (from 10 to 5 grains) after a few years' experience. He was aware of four fatal cases following the administration of nembutal for purposes of anæsthesia. In three of these the dose was 7½ grains. It caused fatalities by action on the brain. It was a tissue poison, poisoning the kidneys. It might cause pneumonia. He had seen a case of pneumonia following a dose of 4½ grains. It might also poison the heart. The condition of the patient, very gravely ill, made the case most difficult to treat. He was not prepared to say she might have died from the sal volatile alone, but this was possible in view of her state of health. He was asked by the coroner whether patients, becoming unconscious after a dose of nembutal, can completely recover and then relapse. He said this was possible. The doses prescribed for her were within limits which are frequently prescribed, but he would not himself prescribe them. He would not personally prescribe nembutal at all. He declined to say what he would have prescribed in the circumstances. Dr. Gillespie, said Sir William, had adopted a treatment which is very generally adopted; but he himself was so deeply impressed with the many cases he had seen of poisoning from the barbiturate group that he would avoid them. He would not criticise others who used them, but he desired that their dangers be realised. In cross-examination Sir William said that in his judgment there was, in the barbituric acid group, only a small margin between the therapeutic dose and the dangerous dose. Dr. Mapother had said he had frequently given 6 grains, but he would have been in the danger zone if he had given 12 grains. Nembutal might cause death without producing observable effects. Asked if there were any signs of nembutal poisoning in Mrs. Beech's case, he replied that the only signs were the absence of signs of disease and the presence of nembutal in the liver and kidneys. The analysis was proof that the full dose was given. Tissue might be poisoned without observable signs. He agreed that Dr. Gillespie had no reason to suspect that the patient was particularly susceptible to nembutal and had good reason to believe she was not. She had taken drugs of the barbiturate group such as luminal and dial. The cases he had known where patients recovered consciousness after taking nembutal and then died were three unpublished cases occurring in one day where the drug was in part given intravenously before a severe operation. He agreed that they were complicated and not pure cases; one must not attach too much importance to them. One other case was a case of pneumonia on Feb. 28th with special susceptibility. A passage was put to him from an article in THE LANCET (1932, ii., 136) by Dr. D. Curran and Dr. L. Minski, as to nembutal in doses of from 3 to 6 grains being "certain in its action, devoid of risk, and free from unpleasant after-effects." He entirely disagreed with it. His objection to nembutal was that it was a new drug with very decided therapeutic action, easily misused. He knew it was very much used. He was aware of no case in medical literature, apart from those mentioned by him, of a direct fatality from nembutal. The drug was somewhat uncertain in its action and he had heard of unpleasant symptoms following its use.

EVIDENCE ON THE OTHER SIDE

Dr. Mapother's evidence on the other side described the extensive use of nembutal at the Maudsley Hospital. He had given it to 328 patients and had administered 6116 individual doses. The maximum quantity in 24 hours had been 13½ grains (4½ grains in three doses). Other patients had had 12 grains in 4-grain doses. The average dose was 4 grains; sometimes 6 had been given. The drug could be regarded as very safe for the particular purpose for which it had been used, to produce sleep in quiet cases, or to obtain a definitely sedative effect in cases of restlessness. It had been given to a patient over a period of weeks. Asked if there had been any unfortunate consequences in the hospital from its use, he said that two patients on the occasion of their first dose had shown alarming symptoms, rather sudden collapse followed by quick recovery. They were patients in bad condition. The dose had been 4½ grains. The same dose was repeated without ill-effect. Nembutal was a drug which was excreted quickly; its effect was transitory. At the Maudsley Hospital it had been used in combination with medinal, bromide, chloral, hyoscine, paraldehyde, and somnifain. Dr. Gillespie's doses were, in his opinion, not excessive. Dr. Douthwaite, assistant physician at Guy's Hospital, also gave evidence in support of Dr. Gillespie's treatment. To show that 1½ grains of nembutal (which Dr. Roche Lynch appeared to have regarded as the maximum dose) was not likely to have a serious effect, Dr. Douthwaite swallowed a capsule of 1½ grains in court. He said he himself had been responsible for giving 6-grain doses in 20 cases. In one case the patient had had 15 grains of medinal the previous night. Death from nembutal occurs in a state of coma; Mrs. Beech had been awake on the Monday, after the nembutal; her death could not be due to this drug. Sir Maurice Craig, who also gave evidence, considered that Dr. Gillespie was wise in trying to get Mrs. Beech off paraldehyde and to substitute barbiturates. The last edition of Hale-White's Materia Medica gives the dose of nembutal as from 3 to 9 grains. If the patient was awake and active on the Monday morning, this showed that the effect of the drug had passed off. Dr. Bernard Johnson dealt in the witness-box with the safety of administering paraldehyde and nembutal in combination. Dr. Gillespie had previously described his own experience of the combination of nembutal and potassium bromide.

Thus the proceedings, while attaching no criminal liability to anyone, established a definite cleavage of opinion as to the safety of certain drugs. An important issue remains to be settled in the light of further experience, but it is significant that the coroner, in spite of the evidence of its dangerous nature, saw no negligence in the careful use of nembutal.

Ear-cutting for Rickets

DURING an inquest at Llanelly last week evidence was given of the curious Welsh custom of cutting

the ears of babies as a cure for rickets. The mother of a 4-months-old child, assuming that the child was suffering from rickets, had taken it to a Mrs. Katherine Rosser, of Trimsaran, to have its ear cut. Medical evidence showed that death was due to heart failure following influenza; the child was not suffering from rickets at all. Mrs. Rosser admitted in the witness-box that she had cut the child's ear according to the local custom; she said that large numbers of adults and children were brought to her from the country districts for this purpose. A small cut is made inside the ear with a razor. Students of folklore and magic may be aware of similar custom elsewhere, and may be able to tell us whether the cut is made with the idea of releasing an evil spirit.

Mrs. Rosser declared that she received no pay for her services. The coroner warned her that this ear-cutting practice was illegal and dangerous, and must be stopped at once; she was fortunate that the evidence had not disclosed circumstances in which she would have been liable to a criminal charge. Dangerous the practice certainly is, both because the combination of unskilled diagnosis with useless remedy may easily mean the fatal exclusion of proper medical treatment, and because magical operations may not be conducted antiseptically. Illegal the practice is if, infringing Section 12 of the Children Act, it amounts to neglect of a child through failure to provide proper medical treatment. It may amount to manslaughter if the recourse to magic can be said to have caused or accelerated the patient's death. Merely to make a small cut in a person's ear at his or her request, for whatever purpose, involves in itself no criminal or civil liability. *Volenti non fit injuria.* Such a voluntary operation is no more illegal than the piercing of the lobe of the ear to facilitate the wearing of an ear-ring. Ear-rings, also, by the by, are sometimes associated with magic significance.

Rights of R.A.M.C. Officer

The Court of Appeal on March 6th dismissed Lieut.-Col. Kynaston's appeal against Mr. Justice Farwell's order, described in THE LANCET last year (Dec. 10th, p. 1302). Having retired from the active list of the R.A.M.C. in 1905, and being thereafter an officer of the Reserve of Officers, Col. Kynaston was recalled to service in August, 1914. His grievance is that he then found the conditions of a Royal Warrant of 1900 had meanwhile been altered to his disadvantage, that he was deprived of seniority of rank to which he was entitled, and that he was compulsorily retained in military service after the completion of his contract and after the removal of his name from the active list and from the Reserve of Officers. Legally, however, his claim against the Crown is hopeless. The King can do no wrong and, except in the rare event of Parliament having given a specific remedy, no subject can sue the Crown on any kind of contract of service. Owing to the constitutional doctrine, which bars such proceedings, the law courts decline to listen to a claim since they cannot grant a remedy. If the claim were for a wrong and not on a contract, it could be made only against the person who committed the wrong (whether he did so in the service of the Crown or not). Col. Kynaston brought his action against the Attorney-General; but if Col. Kynaston was right, and his grievances against the military authorities were well-founded, it was not the Attorney-General who had committed the wrongs of which he complained. So on this ground also his claim failed. The only satisfaction which Col. Kynaston can obtain from the proceedings is the publicity they have obtained and the knowledge that he may be altruistically hastening the day when the Crown Proceedings Bill will at last be passed into law. A Lord Chancellor's Committee of the highest authority has given us to understand that the citizens of this country are unfairly deprived of their proper rights against the Crown—i.e., against public departments—by legal principles which ought to be changed, and by procedural obstacles which are anachronistic. A Bill has been officially drafted; when will Parliament find time for this promised reform?

THE MEDICAL SOCIETY OF LONDON

ANNUAL DINNER

THE annual dinner of the Medical Society was held at the Trocadero Restaurant, London, on Wednesday, March 8th, when Sir John Broadbent, president of the Society, received a large assembly of members and a group of representative guests.

After the loyal toasts Lord Hanworth, Master of the Rolls, proposed the toast of Prosperity to the Medical Society of London in an excellent medley of seriousness and the reverse. Expressing the general as well as his own personal gratitude to the services of progressive medicine, he set out the difficulty which medicine must always have in getting its discoveries accepted, not only by the public, but by leading thinkers. He said that he had read Harvey's famous exposition on the circulation of the blood, the "De Motû," the little pamphlet being bound up, in the copy which he consulted in the British Museum Library, with another pamphlet wherein a Dr. Primrose, addressing King James I., unsettled that monarch by "refuting" Harvey's arguments. Not much later he found that the great Pepys had expressed it as his opinion that "it is not known and it never will be known what is the use of respiration." He quoted from the recipe-book of a great lady of that day a cure for ague which consisted in the patient lining the bottom of his shoes with the leaves of lignum-vitæ. Lord Hanworth asked the audience to imagine what a factor in the life of the seventeenth and eighteenth century was the terror of disease. The reign of Queen Anne was sometimes mentioned as the happiest period of our history, but that happiness must have been marred by the perpetual threats of misunderstood disease. Lord Hanworth concluded by finding the advance of modern science, medical and other, to be a story of progress, temporary set-backs only interrupting its course, and he asked for a spirit of confidence as medicine found new fields for development.

Sir John Broadbent, in reply, reminded the audience that this was the 159th anniversary dinner, the Society having been founded by Lettsom in 1773. He sketched the life of Lettsom, the quaker physician, who was born in the West Indies, was apprenticed as a surgeon and apothecary in England and returned without any diploma to the West Indies, where in a short period he made a considerable sum of money as an unqualified practitioner. With this money he returned to England, was licensed by the Royal College of Physicians, acquired a large practice, and founded the Medical Society of London, to which he presented its first home. The Society had at its origin, said Sir John, 30 physicians, 30 surgeons, and 30 apothecaries, and it remained what he would describe as a polyvalent society with a varied pro-

gramme for its activities. He concluded by a defence of the exclusion of women from the Society, in which he was ingeniously able to exhibit his gallantry.

The toast of the Guests was proposed by Mr. Donald Armour, who alluded to the intellectual prominence enjoyed by the family to which Lord Hanworth belonged, and made appropriate references to Sir Holburt Waring, Dr. J. S. Fairbairn, and Lord Dawson, the presidents of the three diploma-granting Colleges, while the last he described as forming a liaison between the aristocracy and the mass of the profession by combining the office of the president of the Royal College of Physicians with that of the British Medical Association. In coupling the toast with the name of Sir Harold Fawcus he congratulated him on the extension of his post as Director-General of the Army Medical Services.

Lieut.-General Sir Harold B. Fawcus made an excellent recruiting speech. Why on earth, he asked, did the young doctors of the present day seem to regard commission in the fighting services as constituting some separate sort of medical life? Most of those in the room, he said, would have served during the war and must know that medicine in the services was not separated from general medicine, and he failed to understand why there should be difficulty in recruiting the young officers. The pay was good and was paid by the State, but he did not think that money entered greatly into the question. If a belief that a career in the R.A.M.C. provided but limited chances of professional work was commonly held it could be shown that this view was rubbish by a simple inspection of the annual reports issued by the Department.

The guests included the Presidents of the Royal College of Physicians of London, the Royal College of Surgeons of England, and the British College of Obstetricians and Gynæcologists, the Master of the Apothecaries' Society, the Medical Directors-General of the Navy, Army, and Air Force, Sir Farquhar Buzzard, the Presidents of the Royal Society of Medicine, the Chelsea Clinical, Harveian, Hunterian, and West London Medico-Chirurgical societies, and the editors of the *British Medical Journal* and *The Lancet*.

IRELAND

(FROM OUR OWN CORRESPONDENT)

APPOINTMENT OF AN ASSISTANT MEDICAL OFFICER OF HEALTH

A STORMY protest was made at a recent meeting of the County Dublin board of health when a letter was read from the Department of Local Government and Public Health refusing the consent of the Minister to the proposal of the board to make an appointment as assistant medical officer of health and school medical inspector from the ranks of the dispensary medical officers in the county. The Minister pointed out that the duties of the post were radically different from those of a dispensary medical officer and district medical officer of health, and that experience in the latter capacities was not sufficient qualification for the special duties of the post. He directed that the board should refer the appointment to the Appointments Commission, and he sanctioned a salary of £600 a year with vouched travelling expenses.

ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION

The preparations for the annual meeting of the British Medical Association to be held in Dublin in July next are well advanced. The authorities of the Irish Free State, of the city of Dublin, and of the two universities are giving hearty support to the local committees. Among the social events connected with the meeting, in addition to the annual dinner of the Association, receptions or garden parties will be given by the Government of the Irish Free State, the Trinity College, University College, Dr. Steevens' Hospital, the Rotunda Hospital, the Leinster branch of the Association, and others. A provisional programme of the scientific proceedings will shortly be published.

PARIS

(FROM OUR OWN CORRESPONDENT)

AN ASSOCIATION OF PRACTITIONERS

A RECENT sinister concatination of circumstances has thrown an undeservedly macabre light on the French medical profession. There is the scandal, still fresh in the memory, of the medical examinations for hospital appointments in Paris. There are also the unkindly reflections made on the medical profession as a whole as an elusive tax-payer. The trade-union spirit of various medical organisations has also attracted disconcerting attention and disparaging comment. A happy contrast to this sombre picture is a movement, not yet a year old, which shows what a spirit of disinterested coöperation and scientific research the general practitioner is capable of developing when given the opportunity. The Assemblée Française de Médecine Générale was established on March 15th, 1932. Its subsequent career has recently been reviewed in *Le Siècle Médical* by its enterprising secretary-general, Dr. Godlewski. It has numerous sections scattered throughout France, and a programme which looks at least a year ahead. For each general session, which takes place ten times a year, a special subject is chosen for study and discussion. The practitioner is thus given time to collect and sort his material for inclusion in the pool. This body already has its special organ, *La Médecine Générale Française*. Last May the subject chosen for discussion was rural tuberculosis. The subject chosen for the following session was cancer houses. It was the general opinion that, though they might exist, they were certainly rare. On the other hand, the mass of available information pointed to a very uneven distribution of the disease both in time and place. The subject chosen for the third session was the regional clinical manifestation of alcoholism. The parliament of practitioners was in blissful harmony over the ill-effects of spirits and the iniquity of the Government in putting a premium on intemperance. But where wines and cider were concerned, there was a general tendency not to brandish the hobnail liver in the face of its alleged and hypothetical owner. A discussion on alcoholic polyneuritis suggested the existence of centres and epidemics of this disease associated with a too generous use of arsenic in agricultural or industrial activities. The subject chosen for the meeting last December was infections associated with domestic animals, notably cattle. On this occasion much new and interesting clinical light was thrown on undulant fever and allied conditions. At a more recent meeting, devoted to conjugal tuberculosis, the consensus of opinion was in favour of this condition being rare, even when it was subjected to the searching light of serial radiological examinations. If this movement develops as favourably as it has begun, records of invaluable clinical observations collected by practitioners on generations of stationary rural populations may result.

DIAGNOSTIC PITFALLS IN TEMPORO-MAXILLARY ARTHRITIS

The temporo-maxillary joint is quite superficial. But this fact did not, in a case recorded by Dr. M. Jacod in *La Presse Médicale* for Feb. 1st, save the patient from a series of diagnostic errors with a tragio-comic sequence. The story begins in a river in which a man, aged 26, found his passion for fishing stronger than the discomforts he felt on account of the cold wind. He awoke next morning, the left side of his face feeling stiff, and the pre-auricular region very painful. This pain radiated upwards and downwards to the angle of the jaw, but there was no loss of symmetry of the face, no trismus, no auditory disturbance. So he hied him to a dentist who, finding that the left lower wisdom tooth had not erupted, put the blame for all the symptoms on it. Accordingly, an incision was made over it and mouth washes were prescribed. As the pain had become worse instead of better on the fifth day, the dentist realised that the tooth ought to be extracted, and so it was. The sequel to this step was an increase of the pain. The patient now consulted an otologist who, finding nothing amiss with the left ear, apart from some pain in the external meatus, expressed the opinion that the dental extraction was to blame for the pain. On the ninth day the patient consulted his family doctor who, finding some swelling in front of and below the ear, diagnosed acute parotitis on the left side. Evidently an early case of mumps, and doubtless the disease would appear on the right side in a few days. So the patient was confined to his bedroom, and derived what comfort he could from a local dressing. By the twelfth day the "mumps" had refused to extend to the right side, and the symptoms persisted on the left side. The patient himself now noticed that the introduction of a speculum into the external auditory meatus accentuated the pain. A new examination, made presumably by Dr. Jacod himself, revealed the quite characteristic picture of benign temporo-maxillary arthritis *a frigore*. The jaw was immobilised, and counter-irritation with the galvano-cautery was prescribed, supplemented by salicylate of soda given by the mouth for several days. The pain abated in 24 hours, and the movements of the jaw were normal and painless after five days.

CANCER IN TONKIN

In a communication to the Academy of Medicine on Jan. 24th, Dr. Le Roy des Barres drew attention to certain peculiarities in the incidence of malignant disease in the tropics, particularly in Tonkin. After 30 years in a relatively well-equipped surgical hospital, he has come to the conclusion that malignant disease is quite common in Tonkin—a finding contrary to the common belief that malignant disease is rare in the tropics. In 1929 he saw 162 cases, in 1930 186, and in 1931 as many as 215 cases. While in Europe the ratio of connective tissue tumours to epitheliomas is as 1 to 18, in Tonkin it is as 1 to 7·5. In as high a proportion as 18 per cent. of all the cases the penis was the seat of the disease, and penis cases formed 31 per cent. of all cases of cancer in the male. Cancer of the uterus is set down as occurring in 9 per cent., and cancer of the breast in 8 per cent. of the cases; these figures are, however, valueless, as it is not stated whether the percentages refer to all the cases or only to the cases of cancer in women. Whereas cancer of the digestive tract accounts for more than 50 per cent. of all the cases in Europe, it accounts for only 5 per cent. of the cases observed in Tonkin. The average age-incidence for epitheliomas was only 46 years—much lower than in Europe. The average age-incidence for sarcomas was 35 years. Three-quarters of the cases of cancer affected persons between the ages of 30 and 60, and more than half of all the cases occurred between the ages of 40 and 60. A comparison with Bablet's findings, which concern Cochin China mainly, show that while 21 per cent. of the cases of cancer in Cochin China affect the mouth, only 8 per cent. of the cases in Tonkin show this localisation.

PERIODICAL MEDICAL EXAMINATIONS

The achievements of the Life Extension Institute of New York have made some impression in France. The arguments in favour of a complete periodical medical examination are, indeed, so plausible. You overhaul your car or any other piece of machinery periodically to avoid a breakdown, so why not apply the same rule to the even more valuable and delicate machinery of the human body? And if something is good for the Americans, should it not also be good for the French? In answer to these and similar questions, bodies more or less modelled on the pioneer American organisation have begun to appear in France. But the medical profession has not rallied to them with whole-hearted enthusiasm. In at least one such institution the policy seems to have been adopted of adding treatment to the programme of the exhaustive medical examination. The result has been a vigorous protest from the practitioners in the neighbourhood who have seen in this institution a not altogether fair competitor. Those who are familiar with Latin psychology are inclined to be sceptical as to the immediate future of such institutions in France.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED MARCH 4TH, 1933

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 9 (last week 22); scarlet fever, 1763; diphtheria, 789; enteric fever, 19; acute pneumonia (primary or influenzal), 1362 (last three weeks 4106, 2228, 1436); puerperal fever, 56; puerperal pyrexia, 107; cerebro-spinal fever, 51; acute poliomyelitis, 12; acute polio-encephalitis, 3; encephalitis lethargica, 7; continued fever, 1 (Holywell R.D., Flintshire); dysentery, 11; ophthalmia neonatorum, 97. No case of cholera, plague, or typhus fever, was notified during the week.

The notifications of acute pneumonia (primary or influenzal) were still below the expected number by 34 per cent. in England and Wales and 27 per cent. in the County of London.

The number of cases in the Infectious Hospital of the London County Council on March 7th–8th was as follows:—Small-pox, 52 under treatment, 2 under observation (last week 56 and 1 respectively); scarlet fever, 1609; diphtheria, 1583; enteric fever, 6; measles, 298; whooping-cough, 688; puerperal fever, 31 (plus 1 baby); encephalitis lethargica, 231; poliomyelitis, 2; "other diseases," 341. At St. Margaret's Hospital there were 19 babies (plus 12 mothers) with ophthalmia neonatorum.

Deaths.—In 118 great towns, including London, there was no death from small-pox, 3 (2) from enteric fever, 30 (0) from measles, 7 (2) from scarlet fever, 36 (11) from whooping-cough, 28 (4) from diphtheria, 67 (11) from diarrhœa and enteritis under two years, and 242 (42) from influenza. The figures in parentheses are those for London itself.

The only great town reporting more than 10 deaths from influenza was Bradford (with 12). Preston reported a fatal case of enteric fever. Four deaths from measles occurred at Hull, at Liverpool, and at Birmingham, 3 each at Brighton and Newport. Whooping-cough accounted for 4 deaths each at West Ham and Salford, 3 at St. Helens. Liverpool reported 10 deaths from diarrhœa.

The number of stillbirths notified during the week was 312 (corresponding to a rate of 46 per 1000 total births), including 49 in London.

PUBLIC HEALTH SERVICES

The Typhoid Fever Epidemic at Malton

THE report to the Ministry of Health on the outbreak of typhoid fever in Malton, Yorkshire, last November has just been published.[1] The main facts appear to be as follows.

The town of Malton, an old country market town with no prominent industries, is situated on the river Derwent in the North Riding of Yorkshire. It stands on permeable oölitic limestone and calcareous grit except for the clay bed of the Derwent, which clay outcrops at its junction with the middle oölite on the north bank. Although Malton is divided into two unequal parts (Old Malton, with a population of 1000, to the north-east of New Malton, which has a population of about 3500) the water-supply and sewage disposal is the same for both. The water-supply has been derived since 1868 from a shallow well, 14 feet deep, known as the Ladywell. Two hundred yards to the west of the Ladywell is a pumping station which raises the water to a reservoir and water tower, half a mile further west, of a total capacity of 300,000 gallons. The rising main between the pumping station and the reservoir supplies many houses en route. The water-supply is constant and was delivered untreated in any way. As regards sewage, out of 1164 inhabited houses 898 were served by cistern-flushed water-closets, 611 had pail privies, and 10 midden privies. The sewers discharge directly into the river Derwent without screening or other treatment. The contents of the pails are tipped outside the town and sold to farmers for manurial purposes, "a proceeding which is not free from danger."

As regards previous incidence of diseases of the enteric group the late Dr. Bruce Low reported [2] in 1892 that enteric fever and diarrhœa had persistently recurred in the town during the previous 20 years. It was known that when flooded the river Derwent was liable to overflow into the Ladywell and "muddy the water." Dr. Bruce Low confirmed the fact that pollution was intermittent, and recommended that the question of obtaining for the town a sufficient and uniformly wholesome water-supply should be considered without delay. Nothing, however, was done except that the banks of the Derwent were raised in 1895 in order to prevent overflow, and when floods threatened pumping was stopped until they had subsided. In the past 21 years 14 cases of enteric fever were notified.

The first notification in the outbreak at present under review was on Oct. 9th, 1932. Following that the notifications were as follows:—

Week ending—	Cases	Week ending—	Cases
Oct. 22nd ..	1	Dec. 3rd ..	6
,, 29th ..	78	,, 10th ..	2
Nov. 5th ..	64	,, 17th ..	1
,, 12th ..	58	,, 24th ..	1
,, 19th ..	26	,, 31st ..	Nil.
,, 26th ..	11		

Dr. W. V. Shaw, one of the medical officers of the Ministry, arrived on Oct. 25th when about 30 cases had been notified, and confirmed the opinion of Dr. L. C. Walker, the M.O.H. of the urban district, who is also in general practice in the locality, that the disease was probably water-borne, in view of cases being of both sexes, all ages, and many occupations, and scattered throughout the town, and of the fact that the Norton urban district, a contiguous area with an entirely separate water-supply, was relatively free from cases. The action taken up to the time of Dr. Shaw's arrival had been to remove a heap of cattle manure which was adjacent to the well, to advise the inhabitants by crier and handbills to boil all water, and to take over the local cottage hospital and use it as an isolation hospital. The above measures were adopted on Oct. 24th. At a special meeting of the council on Oct. 26th the following recommendations by Dr. Shaw were adopted and put in hand immediately: (1) sterilisation by chlorination of the water, pending the resort to an alternative supply which was not immediately available; (2) removal to hospital of all notified cases; (3) the offer of protective inoculation with antityphoidal vaccine by the M.O.H. or private practitioners; (4) a further warning that all drinking water should be boiled pending such time as it could be sterilised in bulk. The chlorinating plant was installed by midnight on Oct. 27th.

THE SOURCE OF POLLUTION

The next step was to search for the source of pollution. A potential danger, the river Derwent, could be provisionally excluded as the month of September had been remarkably dry and there were no floods. The first patient to be notified (on Oct. 9th) was in the public assistance institution (Spring Hall), which is situated 300 yards to the west of the Ladywell and at a higher level. He was a man of 23 who had been admitted on Sept. 23rd. On or about Sept. 20th he had reported to his local doctor (he lived on a farm some miles away), who found him to be feverish without definite physical signs. As the fever persisted he was sent into the institution, where he was placed in the male sick block, which is separated from the female sick block by the "house." The nursing staff consisted of a charge nurse and an assistant nurse living in the male and female sick blocks, and having charge by day of three wards each, on two floors. By night an inmate acted as attendant in each block, the nurses being "on call" if necessary. The patient (X) was seen by Dr. Walker on the day of his admission and again on Sept. 26th, when a note on his record card was made "To be treated as typhoid." The nurses aver that they were not told of this, and knew nothing of the suspected nature of the disease until they were told by Dr. Parkin, Dr. Walker's deputy, to treat the "case as one of infectious disease" on Sept. 28th. The patient was then ordered to stay in bed, but he habitually disregarded this order and used the water-closet of the ward. On Oct. 2nd the result of an agglutination test was negative, but was positive when it was repeated on Oct. 9th, when X was notified as a case of typhoid fever. He was not, however, removed to the York Isolation Hospital, although such removal was provided for by an existing agreement. On Oct. 22nd two further notifications were received by Dr. Walker, one more on Oct. 23rd, and 15 on Oct. 24th. Dr. Walker then concluded that the infection was probably water-borne and that there would probably be many more cases; he thereupon communicated with the county medical officer of health.

The 43 cases notified round about Oct. 24th would probably have been infected about Oct. 3rd–5th.

[1] Reports on Public Health and Medical Subjects. No. 69. Report on an Outbreak of Enteric Fever in the Malton Urban District. By W. V. Shaw, O.B.E., M.D. Pp. 16 (with map). 1s. 6d.

[2] Dr. R. Bruce Low's Report to the Local Government Board on an Outbreak of Enteric Fever in certain villages situated on the River Rye in North Yorkshire, and on the Water-supply of the Malton Urban Sanitary District. No. 67. 1893.

If X was a cause of the outbreak he must have been a source of infection from the time of his admission on Sept. 23rd. Tests of the drain from the male sick block to a manhole outside the institution showed a considerable leakage, and excavations showed a broken socket in the glazed earthenware pipe at a point where excavation had been made some 18 months previously to lay an electric power cable. Below the break was a large empty cavity into which the water used for testing had flowed and disappeared. Excavations between the Ladywell spring and the broken drain showed by bacteriological examination that the rock was sewage-polluted, and the junction of the clay and the oölite at this point probably determined the seepage of sewage directly into the Ladywell. The distance from the break in the drain to the Ladywell was about 250 yards; this probably accounts for the interval which elapsed between the date of admission of X and the date of the "explosion" of water-borne infections. X was removed from the institution on Oct. 26th and the notification of primary cases ceased about three weeks later; chlorination of the water-supply, begun on the same date, might, however, have had the same result.

The remainder of the report deals with the measures taken to arrange accommodation for the patients in neighbouring hospitals and with the results of inoculation. 1600 persons were inoculated, and no case occurred in individuals inoculated before infection. In persons inoculated during the incubation period there was some evidence that the attack ran a milder course.

SUMMARY AND CONCLUSIONS

The summary and conclusions of Dr. Shaw's report are given below in extenso:—

(1) A total of 235 persons, or approximately 5 per cent. of the population of Malton, contracted enteric fever in the six weeks ended mid-November, 1932. There were 35 secondary cases.

(2) There was no case of enteric fever in the urban district until Sept. 23rd, 1932, when a patient was admitted to the public assistance institution. On Sept. 26th he was found to be suffering from enteric fever, but he was not notified until Oct. 9th, nor was he removed to the York Isolation Hospital until Oct. 26th, although an agreement was in existence between Malton urban district council and the Corporation of York for the admission of cases of infectious disease.

(3) This man's infected excreta were drained into the river Derwent—the common sewer of the town—by a broken drain allowing part of the contents to soak into the surrounding soil, polluting it heavily with the specific infection which gained access to the water-supply, either by drainage from the oölite or otherwise.

(4) The infected sewage probably entered the public water-supply from about Sept. 30th to Oct. 26th, when the patient was removed to the York Isolation Hospital.

(5) The town is sewered into the river Derwent and, apart altogether from the public assistance institution, infected excreta from the water-borne cases of enteric fever had been entering the river Derwent for upwards of a month.

(6) The exceptional incidence of enteric fever in Malton during the seventies, eighties, and nineties of last century, recorded by the late Dr. Bruce Low in his report of May 5th, 1893, has unfortunately been repeated in the year 1932, and although the source of pollution differed the vehicle was the same. I cannot do better than repeat the conclusion of Dr. Bruce Low that "the members of the Malton urban sanitary authority should, therefore, without delay, reconsider the question of obtaining for the town a sufficient and uniformly wholesome water-supply."

School Closure at Barnoldswick

In an address reported on another page Dr. Brincker says that school closure as a method of checking the spread of infection has been discarded in schools where an intelligent method of inspection, surveillance, and control has been instituted. Almost while he was speaking a Yorkshire medical officer of health was defending himself against severe criticism of his action in not closing the local schools during the recent epidemic of influenza. Barnoldswick is an urban district of 11,675 inhabitants in the West Riding, not far from Haworth, whose sometime rector was pilloried by his daughters for his dour expression of opinion; and the Brontë tradition has survived among the members of the district council, but without personal animus, for one member concluded his remarks with the words "We know that Dr. Alderton has been a good servant to us and we wish him well," when the doctor responded, "Every public man must submit to criticism." Another member added that it was not the person of their medical officer but the general attitude of the medical profession towards schools that he was attacking, and he reiterated his belief that "when children are compelled to be herded together they are in more danger of infection than when they are scattered." That this view should still have strong adherents among the public is not surprising, since it is not so long ago that a section of the medical profession thought there was something to be said for it. In former days when there was no close medical supervision of schools the position was quite other than what it is to-day, when the expert services of doctors and nurses are available, and the teachers have acquired skill in observing the earliest signs of ill-health and know which children to watch and refer to the school medical officer or (if he is not immediately available) to private doctors. Without this organisation and unceasing vigilance it would be a very different matter, and it is not surprising that Dr. Alderton was overburdened with the work of keeping fully in touch with the epidemic. Under these circumstances who would not have resented the suggestion that "he had given the matter insufficient attention"? To have closed the school would have been, in the words of a standard text-book, "a confession of failure, a throwing up of the sponge in the contest with disease. The following up of cases, especially of non-notifiable diseases, is lost." There is also the fact that with the improved hygienic conditions of the schools and the present poverty and overcrowding of the homes it is, as Dr. Alderton said, far better for the children to be under cover and in the warmth at school than running the streets. As far back as 1910 Dr. Kerr wrote: "In proportion as the school under present conditions recedes as a factor in disseminating disease, so from the public health point of view do other factors gain in importance. In future the sanitarian must not be hypnotised into regarding the school as a chief centre of disease, but must turn his attention to possibilities of preventing infection in families and houses, courts, and streets." In 1919 a committee of the American Medical Association and the U.S.A. Bureau of Education reported that "the closure of schools is an extremely clumsy, unscientific, and unsatisfactory method of controlling epidemics among school-children. It results not only in loss of school time

and money, but it fails to control, inasmuch as infected children are at large, playing in the streets without restriction, and therefore spreading infection." Sir George Newman has said on several occasions that, except for rare instances in rural districts, school closure is rightly becoming an obsolete practice. Dr. Alderton has the consensus of modern expert opinion on his side.

THE DOCTOR'S DAY

"Come, tell me how you live," I cried,
"And what it is you do!"

XIX.—WITH THE GUARDS' BRIGADE

EVERY young man who joins the Royal Army Medical Corps will find himself, sometime or other, in medical charge of effective troops. Given reasonably good units, there is no job, military or civil, which can be more varied and fascinating, few which provide such opportunities for studying one's fellow men, and none where good honest work can give a more stimulating return. The wise medical officer will proceed with caution until he feels himself firmly established. Then as time goes on, he finds himself becoming more and more a personality, his advice sought after and followed, and in the end he may attain a position of responsibility and influence far beyond his years and military rank. With this introductory note I proceed to describe a day spent as medical officer in charge of troops.

SICK-PARADE BEFORE BREAKFAST

In time to commence work at 7.30, I reach the medical inspection-room where the men reporting sick await me. All four units of my brigade are represented—two famous English battalions, another English battalion, well, not just so renowned, and a battalion of Highlanders a designation which tells their quality, for a second-class kilted regiment has yet to be raised. There are various ways in which the discipline and general efficiency of a unit may be gauged; the quickest is to see the sick-parade. So knowing my battalions, I know in advance that from three of them every man reporting sick will do so with good reason. In the remaining battalion, although I have put an end to attempts at malingering, men still take advantage of trifling ailments in the hope of escaping some duty—sure evidence of lack of discipline and of pride in themselves and in their regiment.

First a batch of men with temperatures have to be examined and sorted out. This needs care, for last week I had the humiliation of missing an early scarlet rash. One man, recently returned from abroad, describes an attack very suggestive of malaria. I make blood smears to accompany him to hospital, in case the pathologist cares to make use of them, keeping back one or two to stain and examine myself for practice. Next, a whitlow to open. A sprained wrist—I *think* there's no fracture, but we'd better have an X ray. "Cough and pain in the chest, sir" proves to be pleurisy with effusion—and so on for a couple of hours, a fine training in quickness and judgment, with the added interest of learning later how the provisional diagnoses finally turn out. Also, during my weekly tour of duty as orderly officer at the hospital, I make a point of seeing every patient from my brigade, medical, surgical, or otherwise, to ascertain exactly how they are progressing. The last case this morning presents no diagnostic difficulty. A Highlander with a large raw sore on his foot, obviously caused by prolonged marching with a neglected blister. He must have suffered torments. I say angrily: "This will take weeks to heal now. Why didn't you fall out on the line of march?" "Sir," replies the man, "I didn't want to give the battalion a bad name." . . . I go off to breakfast feeling privileged to have charge of men like these.

MORNING IN HOSPITAL

Breakfast over, I pay a visit to the main hospital where I have a ward of non-acute cases. One of these is rather puzzling—a man claiming to be deaf, whose auditory tests give such conflicting results that I feel sure he is shamming. I decide to arrange a consultation with the ear specialist, and, if he confirms my opinion, lay a plot to show up the schemer in some dramatic fashion. Then back again to my brigade lines to further several schemes I have in hand for increasing the marching efficiency of the troops. These have been explained to my best battalion, and eagerly adopted. If successful when tested out, as I am sure they will be, two of the others will be keen to follow suit. If the slack battalion prove obstructive, as is their custom, a word to the brigade commander will have them brought to heel. So I see my way clear to achieving the great ambition of my young life—to have the best marching brigade in the army, that is, to go through the strenuous training exercises and manœuvres with the smallest number of march casualties.

In the afternoon a few sets of tennis, then tea and another visit to hospital, this time voluntary. I am working for the M.D., and the specialist in medicine has recommended several "good cases" for overhaul and report. An excellent series, quite as varied as any group I have seen when an H.P., and including one or two diagnostic puzzles which require some study of the Fathers before committing myself. Next week I hope to spend one or two afternoons in a similar way seeing women and children at the Families' Hospital.

GOOD FELLOWSHIP

Only one duty remains for to-night. I have been bidden to a dance given by the sergeants of my Highland battalion, and I feel distinguished by this mark of their esteem. I arrive when the festivities are well advanced, and I am made to realise that I am a welcome guest and among good friends. Indeed, the proffered hospitality is overwhelming—"But, sir, you haven't had a drink with *me* yet!" Alas! the line must be drawn somewhere. My old friend the pipe-major has been less wise, and is now in a high state of exaltation. The whole art and mystery of pipe music, he explains, is behind him; there is no world left him to conquer. "Have you ever heard of *The Lost Pibroch*"? I ask. "Sir," he says, "it is my favourite tune." "But," I protest, "I have read a book which says that in the last 200 years there has been only one man who could play *The Lost Pibroch*, and he, of course, is dead." The pipe-major is no whit abashed. "Sir," he says with emphasis, "that is absolutely true—but before he died he taught it to me."

I walk home under the stars. Doubtless I shall carry out many duties in the Corps; perhaps, who knows, I may one day succeed in obtaining recognition as a specialist in some branch; but whatever happens, I know that I can never have a happier time than my 18 months with the Guards' Brigade.

AMALGAMATION OF BIRMINGHAM HOSPITALS.—It was announced at the annual meeting of Birmingham General Hospital that arrangements for its amalgamation with the Queen's Hospital have now been practically completed, and that when the new hospital centre comes into being it will be financed, controlled, and developed by the amalgamated boards. The General Hospital is governed by trustees, but the Queen's is incorporated by Act of Parliament, and parliamentary sanction to the union will therefore be required.

PANEL AND CONTRACT PRACTICE

The Fund

THE central practitioners' fund for 1932, after 10 per cent. deduction, is £6,055,323. The corresponding sum for 1931 was £6,467,625. The provisional estimate for 1933 is £5,868,000.

What are the Terms of Service?

Any registered medical practitioner can join the panel by writing to the clerk of the insurance committee for his area, and provided that his name has not already been removed from the panel by the Minister of Health after official inquiry the clerk must put his name down on the local list of practitioners for panel service. This is the position in general terms. But on looking a little deeper the matter is not so simple as that, for the practitioner has to sign a form in which he says (among other things) that he desires "to undertake the medical attendance and treatment of insured persons in the area of the committee *upon the terms for the time being in operation in that area*, and for this purpose I hereby accept service *under those terms*." What are these terms of service? Are they the same for all areas—i.e., the general terms of service as agreed between the Ministry and the Insurance Acts Committee? Presumably not, because the words "in that area" are in the practitioner's agreement. How then is the applicant to know the local difference between his terms and those of other areas or the general terms of service? He will probably be supplied, after he has signed his agreement, with the local allocation scheme which deals with the problem of insured persons not on any list, of treatment in emergency, of refusal to accept insured persons for treatment, or of the method of getting an insured person removed from a list. He will also be supplied, after he has signed his agreement, with the local distribution scheme which will explain how he is paid, the methods of calculating lists, the payment for temporary residents, emergency treatment, mileage, and so forth. Both these schemes will have been approved by the Ministry of Health after agreement between the panel committee and the insurance committee, but difficulties may apparently be raised by the insurance committee about other matters such as hours, place, and other occupation, of which the practitioner knows nothing before signing. From the regulations it would appear that the insurance committee can hold up his admission to the panel until they get their way on such matters.

Let us take a supposed case. Can the insurance committee force a doctor, applying to go on the panel, to increase the number of his surgery hours, or to have a consultation time on Sundays? Can the insurance committee refuse permission to go on the panel to a doctor who is also carrying on business as a chemist, or who wishes to continue in practice as a dentist at the same time? Is there any statutory difference between going on the panel and being admitted to the list? How soon after applying to go on the panel can the doctor accept patients by signing medical cards? Can the insurance committee refuse permission to join the panel until these questions of hours, places of occupation, or other occupations have been settled? In the event of a qualified doctor being refused permission to go on the panel owing to "unsatisfactory hours" would he have the right of legal action against the committee?

The answer to these questions is by no means clear. In certain areas precedents have been created by the refusal of the insurance committee to allow a doctor to have his surgery in a building which was regarded as unsuitable—e.g., a farm building; and recently when a dentist, being also a qualified doctor, applied to go on the panel the application was adjourned for consideration until the next meeting, in order that his hours and place of work might be investigated. Some members of the committee seem to have thought that as he was a dentist he could not also be an insurance doctor. These happenings are contrary to the common view that any qualified man (not being an excepted case) may join the panel by simply writing to say he wishes to do so. It would be interesting to hear from insurance practitioners who have met with other restricting or overriding decisions from their insurance committees.

Count of Register

The movement of the panel population continues to show a slight tendency towards the country from industrial areas. The count of the register for the following areas is going up:—

Brighton.	Worcester.	Middlesex.
Blackpool.	Portsmouth.	Somerset.
Southend-on-Sea.	Essex.	Surrey.
Southport.	Kent.	Sussex.
Croydon.	Bude.	Devon.
Oxford.	Cambridge.	

The count is tending downwards in the following areas:—

Barrow.	Burnley.	Preston.
Birkenhead.	Halifax.	Durham.
Bristol.	Huddersfield.	Lancashire.
West Hartlepool.	Middlesbrough.	London.
Bolton.	Oldham.	Yorkshire, W.
Bootle.	Bradford.	

Own Arrangers

Croydon still maintains the lead in giving permission to insured persons to make their own arrangements with other doctors: 84 permissions per 10,000 insured persons as against 85 last year. The county committees keep to the same average this year as last—viz., 7 per 10,000—whilst the county boroughs have increased to 17·9 per 10,000 against 14 last year. These applicants deserve some sympathy. Some of them are homœopathic patients who cannot find an insurance doctor who shares their view; sometimes they have been under the care of a non-panel doctor for a long time before they became insured persons. There seems to be some hostility towards "own arrangers" on the part of insurance committees, dating perhaps from a distant time when non-panel doctors advised their insured patients to remain under their care by contracting out of the Act. There are still many committees in England which do not allow any such claims to go through, and we think the time has come for more sympathetic attention to be paid to them.

GENERAL LYING-IN HOSPITAL.—Last week the Queen opened the new out-patient department, welfare centre, and nurses' home of the General Lying-in Hospital, York-road, Lambeth. Her Majesty succeeded as patron Queen Alexandra, whose predecessors were Queen Victoria and Queen Adelaide. The nurses' home on the upper floors of the same building contains 74 bedrooms and bed-sitting rooms; on the lower floors are a lecture hall and a museum. The cost has been £57,000, of which £1500 only remains to be raised.

CORRESPONDENCE

THE PRODUCTION OF QUININE

To the Editor of THE LANCET

SIR,—In your annotation last week (p. 537) the view is repeated that the present failure to use all the quinine which is, or can be, produced in the world is due solely to the high price of this specific antimalarial remedy. It would be unfortunate if this view alone were to be considered by the proposed International Quinine Conference, mentioned in your leading article of Jan. 28th (p. 206). For it appears that the "Inquiry into the quinine requirements of malarial countries and the world prevalence of malaria," issued by the League of Nations as a preamble to this conference, elicited the information that in several malarious countries the view is held that the cost of the remedy itself is almost the least important factor in the failure to provide for the treatment of malaria in poverty-stricken areas. More important reasons than the cost of the drug itself are said to be: (*a*) the cost of distributing it; (*b*) the apathy of the people and their refusal to take it even when offered free. For these reasons several countries are able to use only a small part of the quinine which they buy; others are only able to use it by adopting special methods of free distribution and of sale under cost price. Lack of sales is not due to the price of the drug; it is due chiefly to the inability of governments to spend money on necessary arrangements for getting it to the people, as well as to the fact that because malaria is not often a fatal disease, the indigenous inhabitants of malarious countries will seldom bestir themselves to obtain quinine except during the periods when the disease is epidemic or unusually severe.

I am, Sir, yours faithfully,

London, March 13th, 1933. S. P. JAMES.

MOBILISATION OF SUGAR INTO THE BLOOD DURING REST

To the Editor of THE LANCET

SIR,—Dr. Martin Raven asks for an explanation why his patient, aged 7½, required more insulin at 12 midnight than he did at 8 A.M. or 4 P.M. It is not easy to give a satisfactory answer. Insulin requirements at night are apt to seem unexpectedly large. Thus, a patient who takes 20 units of insulin at 8 A.M. may eat 100 g. of carbohydrate at breakfast, lunch, and tea, whereas he only eats 50 g. of carbohydrate after 20 units at 7 P.M. This may be partly explained by the amount of carbohydrate used up during the day by muscular activity, and partly by the longer interval between the evening and morning doses (13 hours). It is unusual for the evening dose to be higher than the morning dose, and I have analysed the latest figures of 100 consecutive patients who are eating 100 to 150 g. of carbohydrate in the day and require two doses of insulin. The blood-sugar in these cases is below 130 mg. per 100 c.cm. between 10.30 A.M. and noon, when they are seen at hospital after their usual breakfast and insulin. In 49 cases the morning insulin was 2–6 units greater than the evening dose; in 6 cases it was more than 8 units greater (in one case 14); in 39 cases it was the same, and in 6 cases the evening dose was 2–10 units greater than the morning dose.

When the evening dose has to be definitely higher, say 6 units, than the morning one, I suspect that the patient has some other infection which is associated with a slight rise of temperature at night. It may be possible to discover some source of minor sepsis, but if none can be found the possibility of a tuberculous lesion must be considered. The physical signs of this are often difficult to discover in these mild cases, especially if the mediastinal glands are involved. In some cases I have watched the evening dose gradually decrease without the appearance of any signs of a tuberculous lesion. It is possible that Dr. Raven's patient has some other infection responsible for the great increase of insulin demands during the night.—I am, Sir, yours faithfully,

GEORGE GRAHAM.

Harley-street, W., March 13th, 1933.

RAW AND PASTEURISED MILK

To the Editor of THE LANCET

SIR,—In his review of the effect of pasteurisation upon the nutritive properties of milk Dr. Savage tells us (p. 485) that there are scarcely any studies which are of use for a comparison of raw cow's milk and pasteurised cow's milk; but in his references to my own work no one of the statements he attributes to me is correct. Let me take his remarks seriatim.

Concerning 40 children I tabulate Dr. Savage states that I "examined them at various periods subsequently, the average being about four years." Each of these statements is incorrect, as he will find if he reads the paper.

With regard to my statement that these children were on raw milk, he imagines that it may "easily have been at temperatures equivalent to flash pasteurisation." If he will again refer to my paper he will find that I define what I mean by raw milk—viz.: "Milk which has at no time been heated to more than a few degrees above body temperature," whereas in flash pasteurisation it is heated to at least 154·4° F. and sometimes higher.

Dr. Savage states that I give "no comparable data dealing with pasteurised milk"; but let him compare my Tables I. and II. with Table VI., and read my comments thereon.

He states that I "agree that there is no exact knowledge whether or no effects comparable would result with pasteurised milk"—again quite incorrect. There is some exact knowledge in the comparison of Tables I., II., and VI. as quoted above, and this, though in older children, shows caries in second permanent molars occurring in the ratio of 11 to 77 with raw and pasteurised milk respectively a few years later. What I did write was that I had no exact knowledge of children "*brought up* on sterilised or pasteurised milk." Now it so happens that the 750 boys reported on as having raw milk was the total number of children in the home in which Dr. Corry Mann had conducted his pasteurised milk work, and his work was done during the few years immediately prior to these boys being put on to raw milk, they being under my dental care during this whole time—and before; I did not notice any essential difference in the incidence of caries while pasteurised milk was being used, but two or three years after raw milk had been started the lessened incidence was amazing—and started my inquiry. I had no *exact* figures referring to the incidence of "return" cases of caries in Dr. Corry Mann's time, and so, wishing to be meticulously accurate, forbore to publish a generally noticed clinical phenomenon without *exact* figures for comparison.

Again, Dr. Savage says I infer that "all children get a considerable milk ration during the first three

or four years of life." That is an exaggeration, as I say "practically all"—and from extended inquiries among medical officers and others having knowledge of children in Surrey, Essex, and London, and my own observations, that statement is true; and if it is not true of Somerset then, in view of the present regulations concerning milk distribution to children, it seems to be rather a reflection on those in charge of such matters in that county.

Nor do I infer that the milk practically all children have is "sterilised by boiling or pasteurisation." (Surely it is common knowledge that pasteurisation does not sterilise milk.) What I do say is that it is "almost universally sterilised by boiling or pasteurised." The "incorrect generalisation" to which Dr. Savage refers, is drawn from his misreading of what I wrote.

Apparently Dr. Savage's views on the effects of pasteurisation are by no means in accord with those of the research workers if they consist only of the meagre items on p. 487. He states, regarding vitamin C in milk, that all experts regard it "as an inadequate source of supply," but Providence evidently did not agree with these experts, as milk was provided as the sole infant nutriment of the whole mammalian creation, which still seems to be carrying on very well.

Dr. Savage's conclusion that my paper "offers no evidence either way as regards the relative value of raw or pasteurised milk in preventing caries" seems to me to be based on false and imaginary premises. Indeed, if he realised what an amazing experience it was to see 70 children consecutively (or 95 if I count those under 2 years old) of whom 63 (or 88) were absolutely free from caries in spite of their diet, and the remainder had caries only in teeth erupted before admission (except two who had the milk ration, but there were grave doubts if they had had it raw), and mostly physically subnormal at that, he might see fit to change his views.

I am, Sir, yours faithfully,

EVELYN SPRAWSON.

The London Hospital Dental School, Turner-street, E., March 8th, 1933.

FILARIAL PERIODICITY

To the Editor of THE LANCET

SIR,—The observations by Dr. Carmichael Low, Dr. Manson-Bahr, and Mr. Walters, published in your issue of March 4th (p. 466), together with animal experiments by Dr. Hanschell, raise again the interesting question of the mechanism of filarial periodicity. It has been the source of much speculation and its investigation the subject of much work, but so far there has been no record published of the behaviour or survival of microfilaria bancrofti artificially inoculated into man, an experiment which Dr. Manson-Bahr himself suggested some years ago (THE LANCET, 1929, ii., 45).

Recently I transfused a human volunteer intravenously with citrated blood containing 720,000 embryos, obtained from a case showing nocturnal periodicity. The ear blood of the recipient was then examined at the end of the transfusion, at 3, 6, 12, and 21 hours later, and also at frequent intervals for several subsequent days; but no embryos were found. It must be admitted, however, that between the drawing-off of the blood for transfusion and its injection there was an unavoidable delay of two hours, during which the embryos showed signs of commencing ecdysis. Whether this had any influence on the result of the experiment it is impossible to say, but it makes it desirable that the experiment of transfusing man with blood containing a sufficient number of living microfilariæ be repeated under more favourable conditions, especially as the only vertebrate host of *W. bancrofti* appears to be man himself.—I am, Sir, yours faithfully,

FREDERICK MURGATROYD.

Liverpool, March 6th, 1933.

"EXCITABILITY: A CARDIAC STUDY"

To the Editor of THE LANCET

SIR,—It is so difficult for anyone to collect and collate a series of new facts, running counter to current theory, without first meeting considerable opposition that I am greatly indebted to your reviewer of my book,[1] for his acknowledgment that the experiments eliciting the facts have been carefully carried out. I wish, however, to point out that readers themselves must take over some part of the difficulty of its understanding. It took me several months to convert the late Prof. Waller to the view that excitability was not a primary property of excitable tissue, but that there were instead behind this two deeper properties, the kinesiphores. He informed me of his difficulties after his conversion. He had first taken the facts given in my tracings and attempted to fit them in with the idea that excitability was a tissue-property which could be either raised or lowered. The result of these efforts was an attack of mental indigestion obtained through trying to visualise something being both raised and lowered at once. He next tried a diphasic idea by which the property was to be first raised and then lowered, or vice versa, but that was no better because at the end of the two processes the property had still to be imagined as both up and down. Eventually he recast his original theories on these matters, a process which, as he pointed out to me, grows more difficult as we grow older.

Every reader of my book who attempts to fit the facts in with current theory—i.e., with current understanding—will necessarily find that I have made matters more difficult than ever to understand. The difficulties, however, are not created by the facts, but by attempting to fit them into theories for which they are not adapted. I should like to be given the opportunity of denying the paternity, now seemingly attributed to me, of the "frothy" theory of psycho-physical parallelism, a theory which so many physiologists and psychologists have found quite credible. I merely pointed out that the views concerning muscular functioning which the facts lead me to form would lead also, if they were regarded as of general applicability, to a theory having many resemblances to that of psycho-physical parallelism. This idea, unfortunately, is inconsistent with the theory that the psychologists have been following the muddier path; they seem instead to have marched on the firmer ground. I thought also, when noting these points, that there might be quite a large number of medical men who would be interested in what now seems quite possible—namely, that the organ of mind may include a structure which does not necessarily belong to the order of things we call material.

It seems to me further possible that it would have been better if I had omitted my remarks about Freud—even though I only attempted to give him some of his due—because so many people believe that he is a charlatan whose theories have no scientific basis whatever. To anyone who has committed himself to such a view, it can certainly be

[1] See THE LANCET, Jan. 21st, p. 144.

most annoying to meet new facts not only capable of being interpreted as the evidence that Freud's theories have a very solid basis of fact, but also as indicating that he is so far ahead of the physiology of his time that he and the physiologist have lost sight of one another.

Yet, after all, Sir, my incursions into psychology form possibly about one-fiftieth part of the whole. How much psychology then does one require to know to be able to understand how it can be that what should be a calm judicial review of the facts actually leaves the facts severely alone, and considers chiefly instead the believed muddier ways of the psychologists? I am, Sir, yours faithfully,

W. BURRIDGE.

Department of Physiology, King George's Medical College, Lucknow, March 3rd, 1933.

CHILDREN IN THE CURRICULUM

To the Editor of THE LANCET

SIR,—Your weighty leading article (p. 477) on the discussion by the General Medical Council on this subject has been read by me with great interest and, if I may say so, with approval. I see, however, that you have credited the inspectors, of whom I had the honour to be one, with a definite request for "a separate written paper, and a special clinical examination, to be conducted by those engaged in the teaching of pædiatrics." No such request was made by me. In my general report on the final examinations in medicine and in dealing with the subjects of mental diseases and the diseases of children I wrote as follows:—

"Without expressing any definite opinion as to whether the better plan is to carry out some kind of separation of the two subjects on the lines which have been adopted in some of the centres or not, I feel that in those centres where this does not prevail a healthy tradition should be established that should lead candidates to feel that there is a strong probability that questions may be set in the Written and asked in the Clinical or Oral, or in both."

I am, Sir, yours faithfully,

Leeds, March 13th, 1933. T. WARDROP GRIFFITH.

CONTROL OF INFECTIONS IN CHILDREN'S WARDS

To the Editor of THE LANCET

SIR,—The letter from Dr. Nabarro and Dr. Signy in your last issue prompts me to endorse all they say in regard to the dangers of certain of the simple common infections becoming epidemic in the wards of hospitals and institutions devoted to children. The particular bugbear of the rheumatic child is an acute nasopharyngeal infection, and the danger of this spreading from patient to patient in special hospitals and convalescent homes for children with rheumatic heart disease may become considerable. I have had bitter experience of this but, being firmly convinced of the value of these homes, sought for some means, short of closing down during certain of the winter months, to limit the spread of the apparently inevitable "sore-throat." By putting the beds alternately head to foot, in wards where the number of patients prohibits the spacing of beds beyond the regulation 3 ft., the distance of neighbouring mouths and their attendant droplet infections is increased to nearly double. The expedient appears to have been successful, and throat infections, which in the past would almost certainly have led to minor epidemics, have this year remained sporadic.

I claim no originality in the idea, but made a mental note of the method when listening to a discussion on dormitory infection, which took place last year at the Royal Society of Medicine.

I am, Sir, yours faithfully,

BERNARD SCHLESINGER.

Portland-place, W., March 14th, 1933.

EXPERIMENTAL SHOCK

To the Editor of THE LANCET

SIR,—In your recent annotation of my Arris and Gale lecture on experimental shock, I observe that you state (p. 480) that I consider that primary shock was due to an exhaustion of the vasomotor centre. The use of the term "exhaustion" was a little unfortunate, for I attempted to make it as clear as possible, and gave the evidence, that the centre is not exhausted, although its activity may have been diminished as a result of carbon dioxide or of the receipt of inhibitory impulses. I consider this is rather an important practical point, as it suggests the possibility that during primary shock the activity of the centre may be regained by adequate therapeutic measures.—I am, Sir, yours faithfully,

R. J. S. MCDOWALL.

King's College, Strand, W.C., March 10th, 1933.

INTERNATIONAL CONGRESS OF MILITARY MEDICINE. The seventh International Congress of Military Medicine and Pharmacy will be held in Madrid from May 29th to June 4th. The subjects of discussion include: the general principles affecting the military organisation of a nation in case of war; preventive inoculation in the forces; the treatment of urgent cases under fire; the use of preserved foods as rations; and a comparative study of the different dental and administrative military services. The last day of the congress will be occupied with field demonstrations and a visit to various military hospitals. Members of the congress will also have an opportunity of attending the International Congress of Medical Air Services which is being held in Madrid from June 1st to June 4th, and the third session of the International Office of Military Medical Documentation at Seville, to which a special train is being run. The special train will also visit Granada and Melilla, and an excursion to Morocco is being organised after the congress (June 10th–15th), which members may join. Application should be made before April 1st to the secretary of the congress, Ministero de la Marina, Madrid.

WORK OF CHILDREN'S HOSPITALS.—The jubilee report of the Royal Hospital for Sick Children, Glasgow, emphasises the necessity for a research endowment fund and an orthopædic department. It is pointed out that the latter would form the centre of an organisation for Glasgow, the thickly populated neighbouring districts, and the centre and west of Scotland. Last year there were 5819 in-patients, and more than 25,000 attendances of out-patients. Of the in-patients over 4000 were surgical cases. The country branch in Dumbartonshire treated 993 patients, almost equally divided between medical and surgical cases.—Last year Birmingham Children's Hospital received 3309 in-patients, a substantial increase; new surgical out-patients slightly exceeded 10,000, also a considerable increase. The average stay was 22·5 days, against 25 days. The annual report refers to "the new and important chapter in the hospital's history due to the beneficent action of the president, Mr. C. Kunzle, in placing his château at Davos-Dorf at the disposal of the hospital for the treatment of weakly children, particularly those predisposed to tuberculosis. Fifty-three children were sent up to the end of the year, and the medical staff have been immensely impressed with the results and possibilities of the scheme, which is of great promise" (see THE LANCET, March 11th, p. 538). Mr. Kunzle and his son have arranged for a guarantee fund to ensure the continuance of the work.—At 428 the number of patients admitted to Moseley Hall (Birmingham) Convalescent Hospital for Children last year was an increase of nearly 25 per cent. In his medical report Dr. A. V. Neale says that Moseley Hall's "especial value in the control of rheumatic disease is outstanding."—Pressure upon the new Belfast Hospital for Sick Children is already so great that it was stated at the annual meeting last week that acute surgical cases have to be turned away daily, while it is becoming increasingly difficult to obtain beds for the chronic cases met with in the out-patients' department. There are 63 beds and ten cots, and last year there were 951 admissions and over 16,000 new out-patients. A scholarship is now available every second year for research into children's diseases.

OBITUARY

LLOYD TURTON PRICE, M.B., Ch.B. Edin., F.R.C.S. Edin.

WE regret to announce the death of Prof. Turton Price, professor of surgery at St. Andrews University, which occurred, as a sequel to operation, on Feb. 26th in Edinburgh in the fifty-ninth year of his age.

Lloyd Turton Price was born at Shrewsbury received his preliminary education at Oswestry, and his medical training at Edinburgh. He was a distinguished student, winning many prizes, among them the Crichton research scholarship. He graduated M.B., Ch.B. in 1901, and then at the Manchester Northern Hospital, the Royal Infirmary, Edinburgh, and the Royal Hospital for Sick Children in Edinburgh held the appointment of house surgeon. In 1905 he took the fellowship of the Royal College of Surgeons, Edinburgh, and became surgical tutor at the Infirmary and assistant to the professor of anatomy in the University. In the following year he went to Dundee as assistant to the professor of surgery, Dr. David MacEwan, and thus began his long association with St. Andrews University.

PROF. L. T. PRICE

[Photograph by C. F. Parsons & Son

During the war Dr. Price was chief surgeon for the central eastern district of Scotland to the Red Cross Hospitals, and was attached to the Dundee war hospital as consulting surgeon. The special establishment of an annexe at Dundee for orthopædic patients became his particular responsibility, and his services to the disabled continued after the war and received public recognition.

In 1919 he succeeded Prof. MacEwan in the chair of surgery at the University, and from that period until the end of his life he was a leading consulting surgeon in that part of the country. He held many clinical posts. In addition to his position as surgeon to the Dundee Royal Infirmary, he was also surgeon to the Perth Royal Infirmary, the Forfar Infirmary, and the Arbroath and St. Andrew's cottage hospitals. Thus he had a great field for clinical work, and used it with inspiring energy. He was a sound consultant whom all concerned—the practitioner, the patient, and the patient's relatives—were willing to trust, and he was a fine operator. He extended the reputation of St. Andrews University as a surgical school, and largely as a result of his skill and personality he established Dundee as the consulting centre for the midlands of Scotland. As a teacher the students appreciated his qualities of thoroughness and clearness, which were especially displayed at his clinical classes. He was essentially a teacher and clinician, devoting himself almost entirely to the practical side of his profession and making only occasional contributions to literature. He allowed nothing to interfere with his university work, and he excelled as an examiner. He was deservedly proud of the recent report made by the inspector of examinations sent by the General Medical Council, who stated that "the examination in surgery at St. Andrews University might well be taken as a model of what such an examination should be."

In private life Prof. Price was a man of great charm. He had many interests outside his professional activities, and was a keen sportsman, while his kennel of sporting dogs won international fame.

ALBERT EDWARD ROY HOSKINS, M.B. Sydney

Dr. Hoskins, who died on March 5th at the Southend-on-Sea General Hospital, was the youngest son of Mr. T. J. Hoskins, member of the Legislative Assembly of New South Wales. He was educated at Trinity Grammar School, just outside Sydney, and graduated in medicine at Sydney University in 1925 after winning the prize for operative surgery.

At school and university he had distinguished himself both academically and in athletics. He was a double blue of Sydney University, playing in the Rugby 1st XV. from 1921 to 1925. In 1922 he toured New Zealand with the combined Australian University Rugby Union team, and in 1924 he played forward for Australia against the New Zealand All Blacks. After qualification he held resident posts at the Prince Alfred Hospital and the Royal Hospital for Women, and was for two years senior resident to the Coast Hospital, a general hospital of 900 beds. He left Australia in September, 1931, and within a fortnight of his arrival in England was appointed house surgeon to the Southend-on-Sea Victoria Hospital, and was transferred last year to the new general hospital as resident medical officer. At both of these hospitals his initiative and aptitude for organising were of great value both on the medical and administrative sides, and he was responsible, directly or indirectly, for a number of improvements and innovations. On Feb. 28th he began to suffer from an acute infection of the tongue and neck, which ended fatally in five days. A member of the consulting staff under whom he worked writes of the whole-hearted enthusiasm which marked Dr. Hoskins in everything he took up. "He had a charming personality, and his unfailing cheerfulness and courtesy, his loyalty and discrimination in all his dealings won the hearts of all who knew him. His fortitude and sense of duty were shown in the determined way in which he kept to his post until compelled to relinquish it."

THE LATE DR. ALARIC BALLANCE

WE have received the following from "O. E." who adds, from intimate personal knowledge, interest to the obituary published last week of Dr. A. C. Ballance:—

"How large was the circle of Ballance's friends the company of rich and poor who were present at his memorial service demonstrated. At Eton he always worked and played his hardest. At Göttingen, where he proceeded with his professional studies after Oxford, he refused to fight a duel because duelling was forbidden and also because there appeared to be no danger attached, but he offered to fight any member of the Saxonia Corps with his fists and no

one accepted the challenge. He worked hard at his profession in Germany, and just before the war, when a resident officer at St. Thomas's Hospital, he had begun enthusiastically the translation of a German work on obstetric surgery. He joined the Royal Navy as temporary surgeon on August 5th, 1914, and allusion was made in your columns last week to his services. His heroism under fire at Gallipoli has been recorded by Mr. Douglas Jerrold in the Royal Naval Division. After a prolonged and serious attack of paratyphoid he was on service again at the battle of Jutland. For the Zeebrugge expedition he was one of the many volunteers, and towards the end of the war he joined in the Orkneys a flotilla of flat-bottomed gunboats coming all the way from Basra on the *Euphrates*. On the way to Archangel a heavy gale and the exhaustion of the flotilla's food and fuel nearly ended in disaster. It was not till 1919, after five years of service, that he was able to settle down with his family in Hertfordshire. Widely beloved as he became, perhaps only those who knew him intimately for many years were aware of the true fineness of his character, but all his friends hold memories of him, 'quas neque lugeri neque plangi fas est.'"

JOHN GRIFFITHS, M.B. Brist., F.R.C.S. Eng.

WE regret to record the death at Bristol on Feb. 25th of Mr. John Griffiths at the age of 34 years; his death removes a young surgeon of singular promise.

Sidney John Hermann Griffiths was the son of Mr. and Mrs. E. S. Griffiths, of Portishead; he was educated at St. Mary Redcliff School and took his medical course at Bristol University, qualifying M.R.C.S. in 1924, and F.R.C.S. two years later. Before taking his M.B., Ch.B. in 1925, he had held the Tibbits memorial and Henry Marshall prizes in surgery and the Martyn scholarship in pathology; and after qualifying he went to the Hackney Hospital before he held various junior posts at the General Hospital, leading up to that of senior resident medical officer. For three years in this post he was closely associated with Prof. Hey Groves, when his readiness in the diagnosis of cases and supervision of notes, his assistance at operations and in after-care soon led to his being entrusted with much of the emergency surgery at the hospital. He took up the treatment of fractures and orthopædic cases with enthusiasm and devoted much time to clinical lectures and the bedside teaching of students, with whom he was justly popular. On his appointment as assistant surgeon he acted as private assistant to Prof. Groves, with whom he collaborated in the "Medical Annual," and in the ninth edition of the "Synopsis of Surgery"; he also contributed to the *British Journal of Surgery* a number of interesting cases which came to his notice.

MR. JOHN GRIFFITHS

[*Photograph by Victor Turl*

His care and precision in the examination of patients and his clear evidence about his cases made him a good expert witness and led to his employment in cases of workmen's compensation and litigation about accidents. Apart from his work at the General Hospital he held appointments as out-patient surgeon at the Hospital for Sick Children and as surgeon to the Bruce Melville Wills Memorial Hospital. By hard work and sheer merit he was beginning to build up an extensive consulting practice of his own when his career was ended by a staphylococcal infection through a carbuncle, after an illness lasting only two weeks.

A colleague writes: "Although John Griffiths was on the staff of the General Hospital for only a few years, that short time sufficed to establish him as an accomplished and progressive surgeon. The skill he acquired in thyroid surgery was remarkable and in orthopædics he was whole-heartedly interested and adept. As general surgeon he showed judgment, decision, and rare ability, and to his students he exhibited sound theory and skilful practice. Possessed of superabundant energy his crowded professional life did not prevent his joining in many social activities, for he was a companionable man who understood comradeship in its fullest sense. Through his nature ran a golden thread of childish simplicity and good humour which endeared him to everyone. Cruelty in any form he abhorred, and love for animals was one of the ruling passions of his life. But the secret of his success lay in the fact that he was genuinely interested in his patients as well as in their ailments. Uppermost in his mind was the welfare of the Bristol General Hospital, and by his untimely death that institution has lost one of its most worthy and devoted servants."

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg.-Comdrs. R. F. Quinton and R. N. W. W. Biddulph are placed on the retd. list.

Lt. R. A. Banham (retd.) to be Lt.-Comdr. (retd.).

Surg. Capt. A. McCloy is placed on the retd. list.

ROYAL ARMY MEDICAL CORPS

Maj. J. C. Preston retires, receiving a gratuity.

ARMY DENTAL CORPS

Lt. W. C. Cook to be Capt.

TERRITORIAL ARMY

Lt. E. H. Brindle to be Capt.

G. A. W. Neill to be Lt.

Supernumerary for service with O.T.C.; Capt. G. P. Crowden to be local Maj. with pay and allces.

INDIAN MEDICAL SERVICE

Col. P. L. O'Neill retires.

NOTTINGHAMSHIRE MENTAL HOSPITALS.—Two villa blocks, each accommodating 50 female patients, have been added to the Nottinghamshire county council's mental hospital at Radcliffe-on-Trent. The new buildings include a nurses' home providing for 57 persons, and the entire cost has been about £35,000.

DEVON AND EXETER HOSPITAL.—The medical staff having urged the need for further open-air accommodation, three new sun balconies have been added and dedicated by the Bishop of Exeter. The balconies will take 24 beds, and the cost has been about £75 per bed. It has been decided to spend £50,000 in enlarging the hospital. The extensions will include a new nurses' home and out-patient department, and the reconstruction of the central blocks to meet pressing demands.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Shortage of Medical Officers in the Army

IN Committee of the House of Commons on the Army Estimates for 1933,

Sir FRANCIS FREMANTLE said he wished to raise once more a matter of considerable importance—namely, the number of officers in the medical service. The number of medical officers in the Army was always very much below establishment, and he had raised this question regularly every year for the last 14 years without getting any satisfaction. Whatever their views might be in regard to war and peace, it was most essential to keep the medical service intact and efficient. The medical service had been working on a deficiency in establishment strength for years, and the position was just as serious as ever this year. The total establishment of medical officers required for the Army on the home establishment was 826, and the actual number on the strength was 669; a deficiency of 154 medical officers, or 35 per cent. That was not made up by temporary commissioned officers who were employed, 48, and by retired officers employed, 54.

The position was more serious than the actual numbers suggested. The work was only kept up by having two-thirds of the officers serving abroad. The percentage of majors, captains, and lieutenants at home was 42, and abroad 58, and the period at home was only about two years. As soon as they came back from service abroad they had only two years at home before having to go abroad again. That was partly the reason why the Government could not get officers into the Army Medical Service. Medical officers knew that when they married they would have to spend a great part of their time abroad, because the War Office was able to fill up the positions at home by temporary commissioned officers, while they could not get temporary commissioned officers to go abroad. That became worse and worse every year. The Army Medical Service was becoming more and more a service of old men. That position was definitely recognised in 1931. At that time a memorandum on the health of the Army stated:—

> "The number of new officer entrants in the Royal Army Medical Corps and its supplementary reserve, which has been most unsatisfactory since the Great War, has fallen still lower during the past year, and the deficiency of regular officers is causing grave concern."

When the matter was discussed in the House of Commons the Financial Secretary to the War Office said that all were agreed that this was a very serious matter. It was admitted that the deficiency in medical officers affected not only the War Office, but also the Admiralty and the Air Force, and two years ago it was stated that an inter-Departmental Committee for the three services was being set up for the purpose of finding some solution for the problem. That Committee had been sitting under Sir Warren Fisher, and now they heard that the Committee was proceeding to consider its report. Evidently no solution of the problem had been found or the report was being delayed, because the Committee could not face the solution that was necessary. He (Sir F. Fremantle) had made several suggestions and so had the British Medical Association. He wanted a statement from the Financial Secretary to the War Office, not simply that he was waiting for the Committee's report, the contents of which he probably knew, but that he would put it to the Government and to the Chancellor of the Exchequer that the health services were essential to the Army and that they could not face the possibility of another war with depleted medical services.

Mr. DUFF COOPER (Financial Secretary to the War Office) said the question raised by Sir F. Fremantle was a very serious one and had been under consideration for a long time. The Committee to which the hon. Member had referred was much impressed by the evidence that he had given. He (Mr. Duff Cooper) confessed that the work of the Committee might have slackened about a year ago, when owing to financial conditions there seemed to be very little prospect of obtaining funds for anything, even for so good a cause as this, and it was considered that there was no way of obtaining these recruits except by increased expenditure. He knew that Sir F. Fremantle had his own suggestions; he had studied those suggestions, and he thought that if they could be brought into force, which would mean a good deal of collaboration with local authorities, they might overcome the difficulty. The inter-Departmental Committee on the question, which was never dissolved, but which suspended its activities for a short space of time, partly owing to the financial state of the country, and partly owing to the many responsibilities then resting on Sir Warren Fisher, had now resumed its sittings and was actively pursuing its inquiries with a view to finding a solution to the problem. He could assure Sir F. Fremantle that the matter of the Army Medical Services was really now under close consideration, and that it was hoped that some solution would be arrived at in the very near future.

The War Office were fully alive to the importance of the health of the troops, which was a matter of deep concern at the present moment. With regard to cerebro-spinal meningitis, the figures this year, although still giving cause for great anxiety, were falling off. The number of cases for the past year were 67, out of which 26 proved fatal. That was a remarkably low figure for fatal cases. The authorities were doing all they could to keep in touch with the latest developments of science both in this country and in foreign countries with regard to this disease, and everything they could do in the endeavour to lessen it they would do.

The Air Estimates

On Tuesday, March 14th, Sir PHILIP SASSOON (Under Secretary for Air), in introducing the Air Estimates for 1933 in the House of Commons, said that a comprehensive review was proceeding of the whole personnel of the Service. Referring to the work of the Royal Air Force, he said that, for example, settlers in the backblocks of Canada and Australia had had their daily existence immensely eased and improved and the amenities of civilisation brought to their very doors. Countless lives of men, women, and children had been saved by the provision of medical and surgical aid where otherwise accident or illness would have entailed fatal consequences. Reports of the oversea commands of the flying carried out in the last 12 months included accounts of the conveyance of surgical aid to sheiks in the deserts of Iraq and on the shores of the Persian Gulf; the carriage to remote villages of anticholera and anti-typhoid vaccines; and the supply of food to famine-stricken tribes in Transjordan.

In the course of the debate which followed, hon. Members strongly urged the Government to strengthen the air defences of the country and not to favour a policy of the international control of aviation which it was stated might hamper development in this country.

Mr. WHITESIDE said that the danger in the next war would come not from explosives, but from germs and gases. It might be, he said, that war would not even be declared, but that one nation wanting to destroy another nation would infect rats with anthrax and plague, and send them to the country it was desired to destroy. They might send through the post a parcel containing germs so potent that a whole nation might be wiped out. No Peace Pact in the world could prevent that.

Pharmacy and Poisons Bill

On Tuesday, March 14th, the House of Lords considered in Committee the Pharmacy and Poisons Bill. The Earl of ONSLOW, Chairman of Committees, was in the chair.

On Clause 23 (Power of the Secretary of State to make rules),

The Earl of LUCAN, Captain Gentlemen-at-Arms, moved an amendment providing that the Secretary of State might issue to the Poisons Board a direction that the power of the Board to make recommendations as to the making of rules with respect to certain matters specified in the Clause should not be exercised except after consultation with such body of persons as was specified in the direction, being a body which was, in his opinion, representative of persons engaged in the manufacture of poisons, or preparations containing poisons, and the Board should comply with any such direction. The Secretary of State might from time to time revoke or vary any such direction without prejudice to the issue of a new direction.

The amendment was agreed to.

The Bill passed through Committee and was reported to the House.

HOUSE OF COMMONS

THURSDAY, MARCH 9TH

Protection against Floods

Mr. HALL-CAINE asked the Minister of Agriculture whether the floods of the last few weeks had disclosed any remedial work which could be undertaken as a matter of emergency in order to provide employment and to protect the public against loss through inundations in future.—Major ELLIOT replied: I do not think that the recent floods have disclosed any further developments in the general situation with regard to the need for the execution of drainage works. I would remind my hon. friend that the responsibility for carrying out remedial works as suggested is upon local drainage authorities and is, of course, governed by financial and economic conditions. I may add that catchment boards set up under the Land Drainage Act, 1930, following a conference among themselves on Feb. 10th last, have expressed their desire to submit their views to the Government, and it is hoped to fix an early meeting with them for this purpose.

Cost of Public Assistance

Mr. JOHN MORRIS asked the Minister of Health the total public assistance expenditure of all local authorities in England and Wales, including all expenditure on transferred poor-law services, for the last available year.—Sir E. HILTON YOUNG replied: The total expenditure under the Poor-law Acts in the year ending March 31st, 1931, was £38,561,000 on revenue account and £798,000 on capital account.

National Health Insurance Medical Benefit

Mr. LECKIE asked the Minister of Health whether he was aware that many insured persons, probably between 60,000 and 100,000, would cease to be entitled to medical benefit at the end of this year as a result of the passing of the last National Health Insurance Act; and what steps he proposed to take to ensure that these people should receive medical attention when ill.—Sir E. HILTON YOUNG replied: A prolonged extension of insurance was granted under the National Health Insurance Acts to persons who have ceased to be employed and to pay contributions. After the further extension of title to medical benefit during 1933 given under the Act of last year, a number of persons will cease to be entitled to medical benefit on Dec. 31st next. Within the financial resources of the health insurance scheme no further extension of insurance rights is permissible. These persons will, after the end of the present year, be in the same position with regard to medical attention during sickness as all other persons who are not within the scope of National Health Insurance.

Enamel Ware and Antimony Poisoning

Mr. HUTCHISON asked the Minister of Health whether, in view of the cases of antimony poisoning reported from the use of cheap enamel ware in this country, he would lay down a standard of safe manufacture to which all leading British manufacturers should be compelled to conform; and whether he would at the same time prohibit the importation of all foreign enamelled ware which did not fulfil the requirements above mentioned.—Sir E. HILTON YOUNG replied: I have no power to lay down a standard such as is suggested. I am sending my hon. friend a copy of a circular which I have recently issued on the subject.

Children and Road Accidents

Mr. HANNON asked the Parliamentary Secretary to the Board of Education if his attention had been called to the action of the chief constable at Stoke-on-Trent who provided a policewoman lecturer to address children in elementary schools on traffic dangers and how to avoid them; if the result of this educational experiment had been to reduce the number of accidents to school-children; and if education committees generally would be encouraged to provide facilities for instruction of the same kind.—Mr. HERWALD RAMSBOTHAM replied: My noble friend the President of the Board is aware of the arrangements in question. He understands that the authority are satisfied that the talks have been effective, and that there are grounds for thinking that they have resulted in some reduction in the number of street accidents to children of school age. As regards the last part of the question, memoranda on traffic dangers have been issued by the Board to local education authorities from time to time, and my noble friend has every reason to believe that authorities are alive to the importance of warning children in their schools, either by notice or by the provision of special instruction, on the subject of traffic dangers generally.

Narcotic Drugs Convention

Mr. MANDER asked the Home Secretary when the Government proposed to ratify the Convention for Limiting the Manufacture and Regulating the Distribution of Narcotic Drugs, 1931.—Sir JOHN GILMOUR replied: It is the intention of H.M. Government to ratify the Convention before the date contemplated in the Convention—namely, April 13th, 1933.

MONDAY, MARCH 13TH

Panel Practitioners and Treatment of War Pensioners

Mr. HICKS asked the Minister of Pensions the number of men suffering from war disabilities who had been referred to their panel doctor for treatment; and what was the attitude of his department to the representations made by the British Medical Association protesting against the practice of referring men suffering from disabilities other than wounds to their panel doctors for treatment.—Major TRYON replied: I have no record of the number of men for whom no special treatment by the Ministry, or treatment other than such as their own medical attendant can give them, is found to be necessary. No representations have been received from the British Medical Association on this matter in regard to which there has been no change of policy.

Ministry of Pensions Hospitals

Mr. MCENTEE asked the Minister of Pensions what hospitals were now maintained by the Ministry of Pensions and where they were situated; and whether any hospitals maintained by the Ministry had been closed since Jan. 1st, 1932.—Major TRYON replied: The following hospitals are now maintained entirely by the Ministry of Pensions: Edenhall, at Musselburgh; Dunston Hill, at Newcastle; Chapel Allerton, at Leeds; Mossley Hill, at Liverpool; Maghull, at Liverpool; Cosham, at Portsmouth; Orpington, at Orpington, Kent; Latchmere, at Kingston, Surrey; Leopardstown Park, at Dublin; Rookwood, at Cardiff; and Chepstow Hospital, at Monmouth.

One hospital, Highbury, Birmingham, was closed on Jan. 9th, 1932, and Maghull Hospital, Liverpool, will be given up by the Ministry on March 31st, when the Chepstow Hospital, now undergoing alterations, will be reopened for the reception of patients of the class formerly dealt with at Maghull. In addition to the hospitals above enumerated there are 19 hospitals not under the control of the Ministry in which either the entire accommodation or some part of it is reserved for Ministry patients who are maintained by a capitation rate at the cost of the Ministry.

Prevention of Distemper in Dogs

Mr. HERBERT WILLIAMS asked the Lord President of the Council what steps were being taken to give publicity to the successful inoculation treatment for the prevention of distemper in dogs which had been discovered as the result of the investigations of the Medical Research Council.—Mr. BALDWIN replied: A statement signed by the Duke of Portland and other members of the "Field Distemper Council," which supported the researches, has been very widely published in the press, and I am advised that full accounts of the work and its results have been communicated to the veterinary profession through the medium of the technical journals. The preparations used are now available commercially and are advertised.

Mr. HERBERT WILLIAMS asked if this research work would have been impossible if the Protection of Dogs Bill had been passed into law.

Mr. BALDWIN said he believed it would have been quite impossible.

MEDICAL NEWS

University of Cambridge

On March 11th the following degrees were conferred :—

M.D.—N. M. Goodman and R. Pearce.
M.Chir.—R. Marnham and T. K. S. Lyle.
M.B. and B.Chir.—L. C. Cook.
M.B.—W. H. G. Jessop and M. A. Rushton.
B.Chir.—S. E. Birdsall.

Royal College of Surgeons of England

A meeting of the council was held on March 9th, with Sir Holburt Waring, the president, in the chair. Mr. Cecil P. G. Wakeley, surgeon to King's College Hospital, was elected a member of the court of examiners in the vacancy occasioned by the death of Mr. H. S. Clogg. Prof. Ernest W. Hey Groves was elected a member of the court of the University of Bristol in place of the late Sir Percy Sargent.

Membership of the College was granted to G. P. Goodwin (Camb. & St. Mary's) and E. R. James (Bengal & St. Mary's).

Licences in dental surgery were granted to the following :—

Arnold Barkin, F. J. Bloor, H. A. M. Ching, L. F. Ferguson, A. C. Fuller, F. C. Hampson, W. L. Haworth, J. R. C. Hindle, Margaret D. Hooper, O. E. Howell, J. F. Hunt, Owen Jacob, Harold Kanaar, G. D. Lloyd, U. S. Malik, L. E. Marshall, L. A. Mills, P. K. Robinson, W. F. Rose, W. G. Scoble, B. St. J. Steadman, H. R. Stubbs, R. B. Sumerling, A. W. Turner, W. C. F. Whaley, Millicent Williams.

Diplomas in ophthalmic medicine and surgery were granted jointly with the Royal College of Physicians to the following :—

A. J. Boase, A. J. Cameron, J. L. Connacher, K. G. Das, L. P. J. Evans, F. S. Flynn, G. S. Forrester, N. C. Ghosh, A. L. Kiow, Lu Djung-Lin, C. A. Pittar, V. B. Purvis, S. V. Rao, O. L. F. Senaratne, S. P. Srivastava.

It was decided to hold a reception for the Société Internationale d'Urologie on July 11th, and for the congress of the International Society of Orthopædic Surgery on July 20th.

University of London

At a meeting of the university court on March 8th it was announced that the Armourers and Braisers' Company and the Carpenters' Company had decided to make grants to the university of £2000 and £1000 respectively in the shape of annual payments extending over ten years ; and that the Ironmongers' Company had granted £500 and the Dyers' Company £105. These benefactions will be applied towards meeting the cost of the new ceremonial hall to be erected on the university's site in Bloomsbury. An expression of the court's appreciation and cordial thanks has been conveyed to the companies.

A bequest to the university by the late Mr. Arthur L. Leon has been accepted with great appreciation. The bequest, amounting to some £20,000, is for the promotion and encouragement of post-graduate or advanced research work.

Prof. Geoffrey Hadfield has been appointed a staff examiner in pathology.

Funds for research.—Grants are made annually from the Dixon fund for the purpose of assisting scientific investigations, and the Thomas Smythe Hughes and Beaverbrook medical research funds for original medical research. Application for grants in 1933 should be made not earlier than April 1st and not later than May 15th, and should be accompanied by the names and addresses of not more than two persons to whom reference may be made. Further particulars may be had from the academic registrar.

Institute for the Scientific Treatment of Delinquency

To-day, Friday, March 17th, at 8.30 P.M., at University College, Gower-street, London, W.C., Dr. R. G. Gordon will give a lecture on the Relationship of Delinquency to the Broken Home. Admission is free.

Fellowship of Medicine and Post-Graduate Medical Association

Arrangements for this week will be found in our Medical Diary. At the Royal Albert Dock Hospital, on April 1st and 2nd, there will be a week-end course on clinical surgery, with special reference to the relation of technique and end-result. Demonstrations of medical ophthalmology, primarily intended for M.R.C.P. candidates, have been arranged as follows : Tuesday, March 21st, at 8.30 P.M., at the in-patient department of the West End Hospital for Nervous Diseases, Mr. Lindsay Rea, on the Fundus Oculi ; Wednesday, March 22nd, at 5 P.M., at the Royal Westminster Ophthalmic Hospital, Broad-street, Mr. G. G. Penman, Fundi of Medical Interest ; on Thursday, March 30th, at 8.30 P.M., also at the Royal Westminster Ophthalmic Hospital, Mr. C. L. Gimblett, on Some Points in Medical Ophthalmology. Further particulars of the courses may be had from the secretary of the Fellowship, 1, Wimpole-street, London, W. 1.

Royal Sanitary Institute

The last London meeting for this session will be held at the institute, 90, Buckingham Palace-road, S.W., on Wednesday, March 29th, at 5 P.M., when Lieut.-Colonel C. Waley Cohen will open a discussion entitled Standards in the Milk Industry : a joint responsibility of medical officers of health, producers, distributors, and the veterinary services. Lord Astor will take the chair.

Beit Memorial Fellowships for Medical Research

An election of junior Fellows will take place in July, and application should be made before May 18th, though late entries will be accepted up to June 1st. The Fellows elected in July will be required to begin work on Oct. 1st. Junior Fellowships are of the annual value of £400, and are usually held for three years. Forms of application and all information may be had from the hon. secretary of the fund, Prof. T. R. Elliott, F.R.S., University College Hospital Medical School, University-street, London, W.C.1.

International Congress on Cancer

An international congress on scientific and social aspects of the campaign against cancer is being held in Madrid from Oct. 25th to 30th, when it is hoped to form a permanent international body. It is organised by the Spanish League against Cancer, and will be divided into a social section and a scientific section. Further particulars may be had from the hon. secretary-general, Dr. Julio Bejarano, Facultad de Medicina (Decanato), Atocha 104, Madrid.

Memorial to Dr. Eichholz

An appeal to raise a sum of money to be used as an endowment for the benefit of the blind and deaf, as a fitting memorial to the late Dr. Alfred Eichholz, has been sent out by the presidents of the national institutes. Contributions may be sent to Mr. W. McG. Eagar, National Institute for the Blind, 224, Great Portland-street, W.1, or to Mr. A. J. Story, National Institute for the Deaf, 2, Bloomsbury-street, London, W.C.1.

Pay Beds

Lord Horder recently opened a new wing of Finchley Memorial Hospital which has cost £26,000. There are 26 private wards for people of moderate means, and accommodation for the nursing staff. In his speech Lord Horder recalled that 15 years ago he gave it as a dictum that no lay-out of a hospital should be passed by the responsible authorities unless it provided for pay beds.

Contraceptive Methods

Lectures and demonstrations are given to medical students at the headquarters of the Society for the Provision of Birth Control Clinics, at 153A, East-street, Walworth-road, S.E.17. Further particulars will be given by the secretary, Mrs. Evelyn Fuller.

Research into Rheumatic Diseases

The annual report of the Red Cross Rheumatism Clinic in Peto-place, London, presented last week, shows 78,589 attendances (plus 8040 in the private patients' department), as compared with 77,892 in 1931. Out of a total of 3154 cases discharged during the year, 36 per cent. of the men and 43 per cent. of the women were able to take treatment without interrupting their work, and a further 22 per cent. of the men and 6 per cent. of the women were hoping to return to their work at the end of their treatment. In moving the adoption of the report, Sir Arthur Stanley said that the results obtained at the clinic, both in the way of treatment and in the way of research, were gratifying. "More important than anything else," he added, "is, I believe, the need for additional research. But research costs money, and we have not the funds at our disposal to allow our highly qualified medical staff to indulge in an expansion of this research work which both we and they would like."

At the recent annual meeting of the Royal Bath Hospital at Harrogate the Earl of Harewood announced the initiation, in conjunction with the University of Leeds and the British Red Cross Society, of a scheme of research into the causes and treatment of rheumatoid arthritis. The research worker to be appointed would, he said, have an official position at Leeds University with the title of fellow in rheumatism research. The cost is estimated at £1000 a year, of which the British Red Cross is contributing one-fifth ; this, said Lord Harewood, was a small beginning, but researches of this kind had a happy knack of developing into bigger things. Harrogate is well situated for the purpose ; its Bath Hospital specialises in the treatment of rheumatic affections, and the Rawson convalescent home is available for controlled after-care.

Society of Medical Officers of Health

A meeting of this society will be held at 1, Upper Montague-street, Russell-square, London, W.C.. on Friday, March 24th, at 5 P.M. Dr. E. H. T. Nash (medical officer of health for Heston and Isleworth), Dr. J. Graham Forbes (senior medical officer of the London County Council), and Dr. Guy Bousfield (medical officer of the diphtheria immunisation clinics at Isleworth and elsewhere), will open a discussion on Diphtheria Immunisation, its Possibilities and Difficulties.

Maternity and Child Welfare Group.—At 8.30 P.M. on Friday, March 24th, at the same address, Mr. Sydney Owen will give a lecture on Neonatal Abnormalities.

General Nursing Council

Nine members of the General Nursing Council, to hold office for a term of five years, have been appointed in accordance with the schedule to the Nurses' Registration Act by the following bodies:—*Privy Council:* Lady Limerick and Lady Erleigh; *Board of Education:* Miss E. R. Gwatkin, headmistress of Streatham Girls' High School, and Mrs. J. S. Courtauld; *Ministry of Health:* Dr. M. A. Collins, medical superintendent of the Kent County Mental Hospital, Mr. H. L. Eason, medical superintendent of Guy's Hospital, Mr. M. H. Harper, house governor and secretary of the Royal Wolverhampton Hospital, Dr. M. H. Kettle, an assistant editor of THE LANCET, and Dr. Charles Porter, medical officer of health for Marylebone. These nominated members are additional to the 16 members elected by vote of State-registered nurses.

Brighton Hospitals

By the end of February the five large hospitals in Brighton had held their annual meetings. The work done in each institution during 1932 showed large increases in every department, but the hospitals' ordinary expenditure exceeded the ordinary income by £11,040.—The Royal Sussex County Hospital, which finished the year with a deficit of £5556, showed a record number of in-patients (3812). The out-patients numbered 16,617—a drop of 550 from the previous year—but the out-patient attendances (121,793) were more. Contributions from patients amounted to £8241, an increase of £545.—At the Royal Alexandra Hospital for Sick Children there were, during 1932, 1060 in-patients and 23,600 attendances in the out-patients' department.—At the Sussex Maternity and Women's Hospital income fell short of expenditure by £1880, and the deficit had to be made good by appropriating legacies instead of paying them to the capital account. The hospital has joined the Federated Superannuation Scheme.—The meeting of the Sussex Throat and Ear Hospital was marked by outspoken comments on sweepstakes for hospitals. The chairman said he had sufficient confidence in the people of Sussex to believe that so long as the hospital carried on its work efficiently and well, so long would it receive the support which was necessary to maintain it.—The Sussex Eye Hospital meeting received the 100th report of the governors. The special appeal for £25,000 to build a new hospital in connexion with the scheme of coördination with the Royal Sussex County Hospital had been completed. The cost had, however, greatly exceeded the estimated £25,000, and an appeal will be made for a further £5000, so that the new hospital may be opened free of debt.

London Clinic and Institute of Physical Medicine

At the annual general meeting of the British Humane Association, on March 1st, Lord Scarbrough, the chairman, reported that the total loss on the year's working of this clinic was £354, compared with £1761 in 1931. The number of treatments given was 107,000, of which over 5000 were free of all cost to the patient. Sir Leonard Hill, the general supervisor, said that the activities of the institution were adequately indicated by its new name. The honorary medical advisory board had been strengthened by the addition of Sir Henry Gauvain, and the consulting staff by the addition of two new physicians, a gynæcologist, a manipulative surgeon, and an anæsthetist. With the help of the receiving-room officers and the visiting physicians all patients now received thorough examination before treatment, and when necessary they were sent to a general hospital for treatment. The successful treatment of chronic ulcers by light had been continued, and in addition to other skin diseases birth-marks had been found amenable to intense ultra-violet radiation. The department of pelvic diathermy had gained wide recognition, and diseased tonsils had been successfully treated by diathermy in place of excision. A water-cooled mercury-vapour throat lamp was used with success in cases of laryngeal tuberculosis. The inhalation department continued to be useful for catarrhal and asthmatic complaints, and the foam-bath department had been extended. The private ward had developed in usefulness, and application had been made to the London County Council for the use by clinic patients of ten beds at St. Stephen's Hospital. In a bacteriological laboratory autogenous vaccines were now made by irradiation of the culture fluid with ultra-violet light.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, March 21st.—5.30 P.M., GENERAL MEETING OF FELLOWS. 8.30 P.M., PATHOLOGY. Annual General Meeting. J. A. Murray: A Contribution to the Lymphstasis Hypothesis of the Origin of Cancer. E. H. Kettle and H. E. Archer: The Differential Diagnosis of Tuberculo-silicosis. P. Fildes and B. C. J. G. Knight: Auxin a Growth Factor. R. T. Brain: The Relationship Between the Viruses of Zoster and Varicella.

WEDNESDAY.—5 P.M., COMPARATIVE MEDICINE. Discussion: Deficiency Diseases. Openers: Sir Arnold Theiler and Prof. S. J. Cowell, followed by Dr. H. N. Green, Mr. M. C. Franklin, Dr. H. H. Green, Mr. W. R. Wooldridge, and others.

THURSDAY.—8.30 P.M., UROLOGY. Papers: Mr. A. E. Roche: Growths of the Testicle. Mr. Ralph Thompson: Some of the Rarer Types of Enlarged Prostate. Mr. V. W. Dix: Some Observations on Temporary Drainage of the Kidney.

FRIDAY.—5 P.M., DISEASE IN CHILDREN. (Cases at 4.30 P.M.) Paper: Mr. G. G. Penman: Concomitant Squint in Children, and Modern Methods of Treatment. 8 P.M., EPIDEMIOLOGY AND STATE MEDICINE. Paper: Dr. J. C. Bridge: The Influence of Industry upon Public Health.

MEDICO-LEGAL SOCIETY.

THURSDAY, March 23rd.—8.30 P.M. (at 11, Chandos-street, Cavendish-square, W.), Pathological Exhibition of Specimens and Demonstrations by Sir Bernard Spilsbury, Dr. W. S. O'Donovan, M.P., Dr. Arthur Davies, Dr. John Taylor, Dr. Gledhill, and Mr. W. G. Barnard.

CHELSEA CLINICAL SOCIETY.

TUESDAY, March 21st.—8.30 P.M. (at the Hotel Rembrandt, Thurloe-place, S.W.), preceded by a dinner at 7.30 P.M., Discussion on Doctors who were also Civilised Men, to be opened by Mr. J. C. Squire.

HUNTERIAN SOCIETY.

MONDAY, March 20th.—7.15 P.M. (at Simpson's Restaurant, Bird-in-Hand-court, Cheapside), Discussion on Practical Dietetics, to be opened by Prof. S. J Cowell.

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1, Upper Montague-street, W.C.

FRIDAY, March 24th.—5 P.M., Dr. E. H. T. Nash, Dr. J. Graham Forbes, and Dr. Guy Bousfield: Diphtheria Immunisation.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.

TUESDAY, March 21st, and following THURSDAY.—5 P.M. Dr. Charles R. Box: On Complications of Specific Fevers. (Last Lumleian lecture.)

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn-fields, W.C.,

MONDAY, March 20th, and following FRIDAY.—5 P.M. Demonstrations of Specimens illustrating respectively Diseases of the Kidneys and Testicle. By Mr. C. E. Shattock.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London.

MONDAY, March 20th, to SATURDAY, March 25th.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W., Tues., Practical Problems in Medicine and Surgery. Lecture by Dr. A. J. Scott Pinchin on the Effects on the Heart of Disease of other Systems and Indications in Treatment, at 4 P.M. (Free to Members and Associates of the Fellowship.)—ROYAL WATERLOO HOSPITAL, Waterloo-road, S.E. Post-graduate Course in Medicine, Surgery, and Gynæcology. All day.—BRITISH RED CROSS CLINIC FOR RHEUMATISM, Peto-place, N.W. Tues. and Thurs. at 8.30 P.M. Evening Course in Rheumatism.—BETHLEM ROYAL HOSPITAL, Monks' Orchard, Eden Park, Beckenham, Kent. Tues. and Frid., at 11 A.M., Course in Psychological Medicine.—WEST END HOSPITAL FOR NERVOUS DISEASES, 73, Welbeck-street, W. Daily at 5 P.M., Post-graduate Course in Neurology.—GORDON HOSPITAL, Vauxhall Bridge-road, S.W. Post-graduate Course in Proctology. Afternoons only.—HOSPITAL FOR CONSUMPTION, Brompton, S.W. Sat. and Sun., Week-end Course in Diseases of the Chest. All day.—LAMBETH HOSPITAL, Brook-street, S.E. Frid., 2 P.M., Demonstration of Selected Cases of General Interest, by Dr. G. F. Stebbing, assisted by the Staff of the Hospital.—WEST END HOSPITAL FOR NERVOUS DISEASES, Gloucester-gate, N.W. Tues., Demonstration on the Fundus Oculi, by Mr. Lindsay Rea, at 8.30 P.M. (Specially suitable for M.R.C.P. candidates.)—ROYAL WESTMINSTER OPHTHALMIC HOSPITAL, Broad-street, W.C. Wed., Demonstration of Fundi of Medical Interest. By Mr. G. G. Penman, at 5 P.M. (Specially suitable for M.R.C.P. candidates.)—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W. Tues. and Thurs., 8 P.M., Evening F.R.C.S. (Final) Course.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith-road, W.
MONDAY, March 20th.—10 A.M., Medical Wards, Skin Dept., Genito-urinary Operations. 2 P.M., Medical, Surgical, Eye, and Gynæcological Out-patients, Surgical Wards, Operations. 4.15 P.M., Mr. Gibb: Demonstration of Eye Cases.
TUESDAY.—10 A.M., Medical Wards, Surgical Demonstration. 2 P.M., Medical, Surgical, Throat, Nose, and Ear Out-patients, Operations.
WEDNESDAY.—10 A.M., Medical Wards, Children's Out-patients. 2 P.M., Medical, Surgical, and Eye Out-patients.
THURSDAY.—10 A.M., Neurological Department, Fracture Demonstration. 2 P.M., Medical, Surgical, Eye, and Genito-urinary Out-patients. 4.15 P.M., Lecture, Mr. Woodd Walker: Chronic Empyema.
FRIDAY.—10 A.M., Skin Department. 12 noon, Lecture: Therapeutics. 2 P.M., Medical, Surgical, and Throat Out-patients. Operations. 4.15 P.M., Lecture, Dr. Ironside: Diseases of Nervous System.
SATURDAY.—10 A.M., Throat Operations, Medical and Surgical Wards. Surgical and Children's Out-patients. The lectures at 4.15 P.M. are open to all Medical Practitioners without fee.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY, March 24th.—4 P.M., Mr. F. W. Watkyn-Thomas: Points in the Acute Mastoid Operation.

ST. PETER'S HOSPITAL FOR STONE, Henrietta-street, W.C.
WEDNESDAY, March 22nd.—3 P.M., Dr. Cuthbert Dukes: Laboratory Tests in Urinary Diseases.

NATIONAL HOSPITAL, Queen-square, W.C.
MONDAY, March 20th.—2 P.M., Dr. Riddoch: Out-patient Clinic. 3.30 P.M., Dr. Symonds: Head Injuries.
TUESDAY.—2 P.M., Dr. Walshe: Out-patient Clinic. 3.30 P.M., Dr. Martin: Abscess of the Brain.
WEDNESDAY.—2 P.M., Dr. Martin: Out-patient Clinic. 3.30 P.M., Dr. James Collier: Clinical Demonstration.
THURSDAY.—2 P.M., Dr. Kinnier Wilson: Out-patient Clinic. 3.30 P.M., Dr. Riddoch: Heredo-familial Nervous Diseases.
FRIDAY.—2 P.M., Dr. Adie: Out-patient Clinic. 3.30 P.M., Mr. Elmquist: Demonstration of Re-educative Exercises. (In Exercise Room.)

ST. MARK'S HOSPITAL, City-road, E.C.
THURSDAY, March 23rd.—4 P.M., Mr. L. E. C. Norbury: Diverticulitis.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark-hill, S.E.
THURSDAY, March 23rd.—9 P.M., Mr. W. Daggett: Treatment of Otorrhœa.

NATIONAL COUNCIL FOR MENTAL HYGIENE.
WEDNESDAY, March 22nd.—5.30 P.M. (at 11, Chandos-street, Cavendish-square, W.), Dr. John Rickman: Ambition.

LONDON JEWISH HOSPITAL, Stepney Green, E.
THURSDAY, March 23rd.—4 P.M., Mr. Maurice Sorsby: Oto-laryngological Lecture Demonstration.

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale, W.
THURSDAY, March 23rd.—3 P.M., Dr. F. L. Golla will demonstrate.

MANCHESTER ROYAL INFIRMARY.
TUESDAY, March 21st.—4.15 P.M., Mr. John Morley: Abdominal Adhesions and their Symptoms.
FRIDAY.—4.15 P.M., Dr. J. Wharton: Demonstration of Ophthalmological Cases.

ANCOATS HOSPITAL, Manchester.
THURSDAY, March 23rd.—4.15 P.M., Mr. E. E. Hughes: Renal Tumours.

GLASGOW POST-GRADUATE LECTURES.
WEDNESDAY, March 22nd.—4.15 P.M. (at the Victoria Infirmary), Mr. W. A. Sewell: Surgical Cases.

Vacancies

For further information refer to the advertisement columns

Altrincham General Hospital.—Hon. Gynæcologist.
Beit Memorial Fellowships for Medical Research.—Jun. Fellows. Each £400.
Belgrave Hospital for Children, Clapham-road, S.W.—Two H.P.'s and H.S. Each at rate of £100.
Birkenhead General Hospital.—Hon. Asst. Orthopædic Surgeon.
Blackburn, Queen's Park Institution and Infirmary.—Res. Jun. Asst. M.O. At rate of £150.
Bootle General Hospital.—Cas. O. At rate of £150.
Bristol University.—Sen. Pathologist for Dept. of Preventive Medicine. £700. Also Chair of Pathology.
Burden Mental Research Trust, B.M.A. House, Tavistock-square, W.C.—Principal Investigator. £750.
Burnley Municipal Hospital.—Jun. Res. M.O. £150.
Bury Infirmary.—H.S. to Special Depts. At rate of £175.
Cardiff Royal Infirmary.—H.P.'s and H.S.'s. Also Cas. Surg. O. Each at rate of £50.
Cardiff, Welsh National School of Medicine.—Independent Lecturer in Materia Medica and Pharmacology. £750.
Croydon, Mayday Hospital.—Part-time Visiting Radiologist. At rate of £200.
Doncaster Royal Infirmary.—Cas. H.S. £175.
Durham County Council.—H.S. £150.
Evelina Hospital for Sick Children, Southwark, S.E.—Hon. Physician to the Skin Dept. Also H.S. At rate of £120.
Finchley Memorial Hospital, Granville-road, N.—Res. M.O. At rate of £150.
Grimsby and District Hospital.—H.S. £200.
Guildford, Royal Surrey County Hospital.—Res. Med. and Surg. Officer and Registrar. £250. Also H.S. £150.
Halifax, St. Luke's Hospital.—Sen. Res. M.O. £350.
Harrogate, Royal Bath Hospital.—Res. M.O. At rate of £156.
Hospital for Epilepsy and Paralysis, Maida Vale, W.—Res. M.O. and H.P. At rate of £150 and £100 respectively.
Hospital of St. John and St. Elizabeth, 60, Grove End-road, N.W. Res. H.S. At rate of £75.
Ilford, King George Hospital.—Hon. Surgeon.
Infants Hospital, Vincent-square, Westminster.—Clin. Asst. to Out-patient Dept.
Ipswich, East Suffolk and Ipswich Hospital.—H.S. £120.
Leeds, Herzl Moser Hospital, Leopold-street.—R.M.O. £200.
Leeds General Infirmary.—Hon. Physician.
L.C.C. Consultant and Specialist Service.—Neurologists £2 12*s.* 6*d.* Anæsthetists £1 14*s.* per session. Radiologists £900.
London Hospital, E.—First Asst. and Reg. to Ear, Nose and Throat Dept. £150. Also Hon. Asst. Surgeon.
London Lock Hospital, 283, Harrow-road, W.—Surg. Reg. £100.
Liverpool, St. Paul's Eye Hospital, Oldhall-street.—H.S. At rate of £145.
Manchester, Ancoats Hospital.—H.S. At rate of £100.
Manchester Ear Hospital, Grosvenor-square, All Saints.—Res. H.S. £120.
Metropolitan Hospital, Kingsland-road, E.—Sen. and Jun. H.P.'s and H.S.'s. Also Two Cas. O.'s. Each at rate of £100.
Ministry of Health, Whitehall, S.W.—Vacancy on Medical Staff. £833.
Newcastle-upon-Tyne, Hospital for Sick Children.—H.P. Also Sen. and Jun. H.S. Each at rate of £100.
Paddington Hospital, Harrow-road, W.—M.O. £350.
Plymouth, S. Devon and E. Cornwall Hospital.—Hon. Joint M.O. for Massage and Electro-therapeutic Dept.
Princess Elizabeth of York Hospital for Children, Shadwell, E.—H.P. and Cas. O. Each £125.
Princess Louise Kensington Hospital for Children, St. Quintin-avenue, N. Kensington, W.—Clin. Asst. for Out-patient Dept. Also Hon. Anæsthetist.
Reading, Royal Berkshire Hospital.—Res. Anæsthetist. £150.
Royal College of Surgeons of England.—Two Leverhulme Research Scholarships. Each £100.
Royal Free Hospital, Gray's Inn-road, W.C.—Res. Cas. O. At rate of £150.
Royal London Ophthalmic Hospital, City-road, E.C.—Sen. Res. O. At rate of £150.
Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—Asst. Dental Surgeon. 25 gns. Also Hon. Physician.
St. Mary's Hospital, W.—Cas. H.S. At rate of £100.
Southend-on-Sea General Hospital.—Cas. O., H.P., and Two H.S.'s. Each at rate of £100. Also Second H.S. At rate of £100.
South London Hospital for Women, Clapham Common, S.W.—Asst. Surgeon. Also Anæsthetist. 10*s.* 6*d.* per attendance.
South Shields, Ingham Infirmary.—Jun. H.S. £150.
Sutton and Cheam Hospital, Surrey.—Res. M.O. £150.
Swansea General and Eye Hospital.—H.P. At rate of £150.
West Bromwich and District General Hospital.—H.P. and Two Cas. H.S.'s. Each at rate of £200.
Westminster Hospital, Broad Sanctuary, S.W.—Jun. Asst. Pathologist. Also Asst. H.S. At rate of £150 and £52.
Wigan Royal Infirmary.—H.S. At rate of £150.
Wolverhampton Royal Hospital.—H.S. for Orthopædic Dept. and H.S. for Ear, Throat and Nose Dept. Each at rate of £100. Also Surg. Reg. and Res. Asst. Surg. At rate of £250.

Births, Marriages, and Deaths

BIRTHS

DULAKE.—On March 3rd, at Reigate, to Nina Dulake, M.B., D.O.M.S., wife of Lawrence Dulake, M.B., B.S.—a son.
FRYER.—On March 5th, at the Cottage Hospital, the wife of Dr. D. W. Fryer, of Abergavenny, of a son.
MCCARTAN.—On March 2nd, to the wife of William McCartan M.D., Bleak House, Epsom, Surrey—a daughter.
MCCULLAGH.—On March 2nd, at Harley House, the wife of W. McK. H. McCullagh, F.R.C.S., of a daughter.

MARRIAGES

WHITE—WALKER.—On March 4th, Ernest White, M.R.C.S., L.D.S. Eng., to Dorothea Walker, of Almsmead, Harrogate.

DEATHS

CREERY.—On March 7th, at Riverton, Coleraine, John Tate Creery, M.B., B.Ch., T.C.D., in his 76th year.
O'FERRALL.—On March 13th at Coldharbour-lane, S.W., Edward French O'Ferrall, L.R.C.P.
REYNOLDS.—On March 10th, in London, Major Douglas Reynolds, M.C., R.A.M.C., aged 49.
SOWRY.—On March 12th, at King-street, Newcastle, Staffs, George Herbert Sowry, M.D., F.R.C.S., M.R.C.P., aged 62 years.
WHITTAKER.—On March 8th, at First Avenue, Westcliff-on-Sea, Essex, William Mark Whittaker, M.A., M.B., T.C.D., L.R.C.S.I.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

THE HEALTH OF MERCHANT SEAMEN IN 1931

By FLEET-SURGEON W. E. HOME, O.B.E.

THE return of deaths reported to the Board of Trade in 1931 of men employed in the mercantile marine is more interesting than its predecessors, for it tabulates the deaths of British seamen by ages in the same groups in which they were enumerated at the census of seamen in April of that year. As a result we can now calculate the death-rates for the different ages for 1931 with some degree of confidence. Unless otherwise stated, we are dealing here with British seamen only. They were enumerated at 108,882 (amongst them 1635 women, stewardesses, &c.), their deaths from disease were 315 (2·9 per 1000), from violence 280 (2·5); in all 595 (5·5). It was in 1930 that for the first time the deaths from disease were more numerous than those from violence (accidents, homicide, suicide, and heat stroke), formerly in great excess; the earliest known figures are those for 1901–02, showing by disease 596 but by violence 1067 (about half of these were in sailing ships, of which there then were 897 in the foreign trade, but in 1931 only one).

Ages.	Census of seamen, 1931.		British merchant seamen's deaths, 1931.					England and Wales, all occupied and retired civilian males, 1921–23. (Reg.-Gen., 1927.)				
	No.	Proportion.	Disease.		Violence.		Total rate.	Proportion.	Death-rates.		
			No.	Rate.	No.	Rate.			Disease.	Violence.	Total.
–20	10,994	101	11	1·00	40	3·6	4·6	105	2·1	0·4	2·5
20–	18,163	167	21	1·15	28	1·5	2·6	114	3·1	0·4	3·5
25–34	35,163	324	63	1·8	83	2·3	4·1	213	3·6	0·4	4·0
35–44	22,842	210	58	2·5	60	2·6	5·1	206	5·8	0·6	6·4
45–54	15,213	140	83	5·5	46	3·0	8·5	177	10·8	0·8	11·6
55–64	5,782	53	67	11·6	21	3·6	15·2	113	24·5	1·2	25·7
65–	561	5	12	21·4	2	3·6	25·0	72	90·8	2·1	92·9
Not stated	164	—	—	—	—	—	—	—	—	—	—
—	108,882	1000	315	2·9	280	2·6	5·5	1000	7·8	0·6	8·4
									ages 16–65 only.		

In the Table I have compiled are shown, in the first column, the grouping of the ages; in the second, the numbers enumerated; in the third, the proportion in the merchant service per 1000 at the various ages; then by ages the deaths from disease and the death-rate; the deaths by violence and the death-rate; and next, the total death-rate. For comparison, in succeeding columns are given the age proportions and the death-rates by disease, violence, and total of the largest group in the Registrar-General's Occupational Mortality Supplement for 1921, the five millions of "All Occupied and Retired Civilian Males" in 1921–23. Inspection shows the death-rate from disease increasing with age among seamen much as it does ashore, slowly, that is up to 45, and thereafter more rapidly, the employed seamen's rate always remaining about half that ashore; but the rates from violence are at most ages about four times higher at sea, and under age 20 when boys and young seamen are beginning to know and have not yet learned how to avoid the risks of their trade, it is nine times as much.

The death-rate for seamen at all ages to 65 (5·5) is much less than the civilian rate (8·4), as there are so many more seamen, proportionally, in the lower ages with the lower death-rates. Of individual diseases the most deadly were pneumonia 45 (0·4) and phthisis 34 (0·3); they caused, proportionally, more deaths among the 49,215 lascars, pneumonia 35 (0·7), and phthisis 28 (0·6). The nosological list has been extended this year, indeed perhaps too much has been attempted. Thus a line is now given to syphilis with its six deaths, while another line is wasted on the two deaths from general paralysis and locomotor ataxia. One wonders how men with diseases so chronic and well known, obviously too so advanced, managed to pass the medical examination when they joined their last ships.

THE HOUSING OF THE POOR

ON March 9th Dr. C. Killick Millard, medical officer of health for Leicester, gave a Chadwick lecture in London in which he pointed out that the housing problem to-day is the problem of providing decent healthy housing for the poor. Those who are not of the poor can now be catered for by private enterprise subject to the laws of supply and demand. In the past, he said, the poor never really have been decently housed, and there is no prospect that they ever will be in the future unless the State, in one way or other, is prepared to pay part of the cost. In other words, the housing problem, which of course includes the slum problem, cannot be solved without the expenditure of public money. But it is to the interest of the State that all its citizens should be decently housed. Money spent in achieving this end will be wise expenditure, and will incidentally relieve unemployment, and thus help the country back to true prosperity.

In striving to secure decent healthy housing for the poor, Dr. Millard continued, we must not stickle too much about "standards." A small loaf is generally better than no bread. It is better for all to have reasonably good houses than for some favoured ones to have very good houses and the rest to have very bad houses, or no houses at all. If he were given plenary powers his policy would be as follows:—

1. As municipal houses have largely got into the hands of people who are not the ones most in need of housing assistance, their rents should be raised, after due notice, to the full economic level.

2. Many tenants would be glad to stay on and would pay the increased rent, so that these houses would cease to be a charge on the community. The money so saved, and it would be a very substantial amount, should be used for giving assistance to others who really needed help.

3. Tenants able, but unwilling, to pay the increased rent should be given a reasonable time in which to find other accommodation. They could well be catered for by private enterprise.

4. Tenants claiming to be unable to pay the increased rent should be required to submit to an investigation into their circumstances, and if their claim is substantiated they should be granted assistance in the form of temporary rebates from the rent according to scale, such scale to be devised to give special consideration for dependent children. All rebates would be subject to periodical revision and would be regarded and administered as a special form of public assistance.

5. Tenants without children, and not likely to have any, who are occupying a larger house than they require, and who are not able to pay the economic rent, should be transferred to a smaller house.

6. Persons living in privately owned houses, but unable to pay the rent, or requiring a larger or better house, should be entitled to similar assistance, provided their circumstances justify it.

7. Overcrowding, being one of the worst features of slum life, must be relieved before the slum problem can be effectually dealt with. The 1930 Housing Act should be amended to enable overcrowding to be dealt with under Part II. as well as under Part I. This is urgently necessary.

8. *Reconditioning.*—In view of the urgent need of houses to let at a rental within reach of the poor,

reconditioning of old houses, as far as is practicable, ought to be encouraged as a national policy. Where owners are unable to undertake reconditioning the community (local authority or public utility society) should do so; something was to be said for a national housing trust, with a national outlook and national support, but with local branches. Reconditioning need not entail much expense on the community. Necessary repairs to all houses, new or old, should be enforced more vigorously, and landlords in default should be penalised.

9. *Demolition.*—For the present and so long as the shortage of houses continues acute, a "massed attack on the slums"—i.e., schemes of wholesale demolition on a large scale—will be difficult if not impracticable, however much we may wish to see old and inferior houses swept away. The urgent need in most places is for more houses and for cheaper houses. When these are available demolition will be an easy task. In the meanwhile, only the worst houses to be demolished (under Part II. of the 1930 Act), but there will be enough of these to keep the building trade busy with replacement houses for a long time to come.

10. *Subsidies.*—Subsidies under the 1924 Housing Act should cease, but in place thereof the community ought to spend a substantial amount annually in giving temporary help towards rent to those who really need it, and who would not be able to secure decent healthy housing without it. The national exchequer should share with local authorities the cost of this as a set-off against what will be saved by the cessation of building subsidies.

Dr. Millard calculates that the saving to the community by stopping the 1924 Act subsidy will be about £400,000 per annum, and this will be *cumulative*, going on automatically for 40 years. Thus at the end of ten years it will be £4,000,000 per annum, and so on. The amount to be spent on rent assistance, on the other hand, will *not* be cumulative. Moreover, as prosperity returns the need will rapidly diminish.

PUBLICITY AND CRIME

THE scientific study of crime is handicapped more severely than the scientific study of most other human ills. The reason for this, as Mr. Kingsley Martin, the editor of the *New Statesman*, explained in a lecture to the Institute for the Scientific Treatment of Delinquency on March 3rd, is that both press and public are vitally interested in maintaining a different attitude to crime altogether—one based on the most primitive motives and entirely opposed to any attempt to regard crime from a reasonable point of view. To the inhabitants of an industrial civilisation, whose lives are for the most part extremely uninteresting, it is a source of joy to experience vicariously the satisfaction of their basic instincts in identifying themselves either with the hunter, in the form of the skilful and merciless detective, or with the hunted, in the form of the villainous criminal or the hapless victim. To render the satisfaction complete it is necessary that the crime shall have a considerable sexual content. Those responsible for the policy of many of our newspapers make full use of the tremendous opportunities of profit which lie in exploiting this instinctive hunger for horror.

It is permissible to ask "Why not?" It might seem at first sight that to read of lust and violence affords a harmless outlet for passions that would otherwise find their expression in deeds. Mr. Martin, however, brought forward evidence that the deliberate cultivation by the press of this attitude towards the crime increases crime itself, and tends to defeat the efforts of society to prevent and to punish it. Unfortunately, the adequate defence of a murderer rests, he said, on the facts of the crime being sensational enough to justify a newspaper in paying a sufficient sum for the accused man's life story to enable him to employ expensive counsel, while at other times publicity may prejudice the prisoner's case. In a debate in the House of Lords it was suggested that murder reports could be restricted, as divorce reports have been; but Mr. Martin believes that it would be against public policy to prevent the fullest reporting of the trial itself; the matter which needs strict censorship is the preliminary hearing before the magistrate.

The survival of the human race depends on whether man as a species can master his instincts by means of reason. In the case of crime, which is a disease of civilised communities, man is not only making little attempt to master his instincts, but is deliberately using a great part of his reasoning faculty to amplify a wasteful and disastrous concession to them. Those few who see the necessity for studying crime objectively have to face the vast struggle of persuading many millions of their fellows and several dozen powerful and determined corporations to give up a practice which is very dear to their hearts—that of regarding it sentimentally and dramatically.

THE HYGIENE OF MENSTRUATION

THE hygiene of menstruation has made great strides in the last decade. The tradition that bathing is dangerous has been discarded in all educated households, where now the doctrine prevails that comfort depends as much on an ample hot water supply as on the frequent replacement of soiled absorbent pads. The pads now most popular are those intended to be destroyed by burning or by solution in water after use, and girls are taught to avoid discomfort by changing them freely. Facilities such as a slot machine and a tin for used pads are being increasingly provided in the pavilions of school playgrounds, while at some hostels for adults, notably the Nurses' Home at the Middlesex Hospital, a special gas incinerator is installed for this purpose. When frequent changes can be made the ordinary untreated gauze and wool pad on the market has no serious drawbacks; when, however, conditions are inopportune for such changes, the use of a pad impregnated with a substance which inhibits the growth of bacteria doubtless has advantages. The manufacturers of Sterisan sanitary towels claim that the gauze and outer absorbent wool of their product are specially treated to inhibit bacterial growth. The attachment of a pad by means of a soft rubber belt, such as that made by Kleinert Rubber Co. in various sizes, instead of a rigid belt or a piece of knotted tape, and the elimination of all sources of irritation or local soreness, is likely to reduce greatly the number of women who complain of menstrual pain. Unfortunately, the answers received in connexion with most statistical inquiries do not differentiate between deep pain attributable to the period and superficial soreness or dragging, which can be eliminated by careful selection and adjustment of belts and pads, and, most important, frequent renewal of the latter.

Appointments

Certifying Surgeons under the Factory and Workshop Acts: GREEN, H. J., M.B., Ch.B. Aberd. (Banff); JAMIESON, ELIZABETH G., M.B., Ch.B. Glasg. (Kilbride, Bute); LALONDE, T. P., M.B., Ch.B. Bristol (Romsey); and MEIKLE, W., M.B., Ch.B. Glasg. (Whittlesey).

London County Council: WEST, H. O., M.D., B.S., D.P.H., Medical Superintendent, promoted from Medical Superintendent, Archway Hospital, to St. Giles Hospital; AGASSIZ, C. D. S., M.D., M.R.C.P., Ch.B., D.P.H., promoted from Medical Superintendent, High Wood Hospital for Children, to Archway Hospital; READE, A. G. L., M.R.C.S., L.R.C.P., transferred from Senior Medical Officer in the Public Health Department to High Wood Hospital for Children.

WEST SUSSEX ASSOCIATED HOSPITALS CONTRIBUTORY FUND.—On March 4th, at the annual meeting at Chichester, it was reported that the membership during 1932 had increased by 1200, bringing the total membership to 19,900. The available income amounted to £5,592, of which £4845 had been paid to various hospitals for treatment of members.